Common Ground

Recommendations for Policy Reform to Integrate Wildlife Habitat, Environmental and Agricultural Objectives on the Farm

A Report By:
John Girt

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Forward

Wildlife Habitat Canada was established on February 24, 1985 as a non profit foundation to promote and financially support innovative habitat programs across Canada. In an assessment function, it has provided independent reviews and recommendations to minimize the wide variety of human-made impacts on wildlife habitat.

The wildlife community has recognized the major impacts of agricultural programs and policies on the quantity and quality of the remaining wildlife habitat on the agricultural landscape. The Prairie Habitat Joint Venture of the North American Waterfowl Management Plan accepts that, without an alignment of conservation objectives for wildlife habitat, along with those for soil and water,with future agricultural programs, the direct programs for the acquisition of wildlife habitat and for stewardship initiatives will not stop, let alone reverse, the degradation of habitats.

Wildlife Habitat Canada with the support of both Agriculture Canada and Environment Canada have commissioned this report to provide the background information and recommendations to stimulate discussion on this important issue. The report is timely and is aimed at a wide variety of players, from the authors of the Environmental Agenda to those involved in re-aligning existing and designing new agricultural programs for the 1990's. It represents an attempt to define a consensus position, reflecting a wide diversity of perspectives after extensive consultations with the agricultural and wildlife communities. The set of recommendations, taken as a whole, should significantly improve our effectiveness in incorporating habitat for wildlife within a 'sustainable' policy framework that supports the economic and social needs of the agricultural community.

While the opinions expressed are obviously the author's own and do not necessarily reflect the views of the organizations supporting his work, their representatives congratulate the author for an excellent and timely review.

David J. Neave
Executive Director
Wildlife Habitat Canada
April 16, 1990

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Many thanks to you all and to those that I have inadvertently missed.

John Girt

Preface

This report was finished in April, 1990 and reflects my understanding of Canadian agricultural policies as they existed over the winter of 1989/90. By the time you read this report, parts of it will probably be factually out of date. I would hope, though, that you will be able to see that the changes that occurred were in the direction proposed by me.

John Girt

While the conclusions of this report are provided to stimulate consideration of better ways of providing public support to Canadian farmers, they are not necessarily the official positions of the sponsoring agencies.

The Project's Steering Committee

Ken Cox, Wildlife Habitat Canada
Steve Henderson, Agriculture Canada
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Dave Neave, Wildlife Habitat Canada
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Executive summary

Canadian farmers are the most influential managers of our rural landscapes. Many of the landscapes that we frequently find appealing are ones that have been greatly modified by agriculture. There is also no question as to the deep sense of responsibility that most farmers feel towards their land. They have been among the first to notice the extent of soil and water problems of modern farming and to address the issues head on.

On the other hand, all is not well with the countryside, particularly in the Prairies:

- *Wetlands, one of the most productive and rich ecosystems continue to disappear*
- *Grasslands, trees, and other unploughed areas are also disappearing and becoming too separate from one another to provide sustainable wildlife populations*

The land must also protect humans and wildlife from increasing amounts of chemicals (fertilizers and pesticides) being applied to fields. Its ability to absorb them and to break them down is being threatened by:

- *loss of trees*
- *declining organic content of soils*
- *by the replacement of permanent vegetation by crops that only offer living, vegetative protection for the soils during a small portion of the year*

And farmers themselves are suffering from the economic effects of soil erosion.

How have these seeming contradictions between farmers' intents and performance come about? The crux of the explanation is that:

Agricultural policy has tended to ignore its impact on the environment and created an economic framework for farmers that works at cross-purposes with objectives for the environment and wildlife habitat.

The impact of agricultural policies

Existing farm policies tend to:

- *reward expansion of cropland irrespective of whether it would otherwise be in crop production, and provide no rewards for using it for habitat or for environmental protection*
- *make land use change on cropland difficult because a farmer's income and income security will decline faster than his returns from crop production (farmers can receive up to $40 per acre per year for keeping land in crop production)*

This leads to:

- *marginal land being used for crop production*
- *more crop specialization and monoculture*

Leading, in turn, to the environmental problems for soil, water and habitat.

The policies at issue include:

- *Western Grain Transportation Act*
- *Crop Insurance*
- *Wheat Board policies*
- *Disaster relief programs, e.g., Drought and Special Canadian Grains*
- *Input subsidies*
- *Agricultural land improvement subsidies particularly for land clearance and drainage*
- *Lack of a broadly funded program to support environmental and wildlife interests - compare with levels of support*

for farm income and farm production. Society has to rely on farmers to provide environmental management and to provide most of the wildlife habitat this country requires - there is no more effective and cheaper way of doing it - but society must give them more support

Many agricultural programs are currently undergoing an intensive review. This presents an *opportunity* to adjust policies and programs not only to be consistent with the desired direction of these reviews but to be more supportive of habitat objectives. This must be achieved without undermining the public support offered to the farming community.

Some important points to bear in mind are:

1. There are alterative ways of providing income stabilization to farmers to help offset the financially damaging effects of natural disasters and short term fluctuations in market prices.

2. In many areas, under financially limited habitat incentive schemes, farmers are accepting payments to provide habitat on a long term basis for less than the costs to governments of continuing crop production.

   Examples of these schemes include:

   - *programs delivered by the Federal Government (P.F.R.A.'s Permanent Cover Programs in the Prairies)*
   - *landowner programs delivered by wildlife agencies in the Prairies, including HELP in Manitoba, the Prairie Pothole Project in Saskatchewan, Alberta's Habitat Retention Program, and Prairie Care*
   - *Private Stewardship projects delivered by Wildlife Habitat Canada and others, including Ontario's Landowner Stewardship Program*
   - *The Montague County Program in P.E.I. where 22 agencies have become involved in a comprehensive watershed management project*

3. Conversion of land to habitat from crops will not jeopardize Canada's ability to maintain or increase its share of domestic and foreign markets for agricultural commodities.

Four key agricultural policy adjustments in support of wildlife habitat and improved soil and water management on Canadian farms need to be considered by governments:

1. *Remove eligibility requirements from agricultural programs based upon areas in production of commodities, and remove incentives that favour one type of land over another for farm production.*

2. *Decouple income stabilization programs from commodities.*

3. *When farmers wish to participate, providing incentives for them to improve habitat supply, and soil and water management from the resulting savings on existing program expenditures.*

4. *Support the development of local, municipal delivery systems for the realigned funds.*

These proposals require the joint action of the federal and provincial governments, and the involvement of agricultural, municipal, wildlife and other environmental agencies. However, the success of the venture will depend on the response of farmers. They must be able to feel that governments are fully and permanently committed to the improvements being sought, and that the provision of environmental goods and services on farms is a legitimate part of the

farm business.

These proposals are also consistent with:

- *Canadian and GATT positions respecting agricultural policies and international trade*
- *Canadian commitments regarding agriculture and environmental management, including:*
  - *The Canada-U.S. North American Waterfowl Management Plan, in which it is recognized that adjustments in agricultural policies will be necessary to meet Canadian objectives for waterfowl populations.*
  - *The Great Lakes Water Quality Agreement, under which both Canada and the U.S. are to reduce pollution of the Great Lakes caused by agricultural chemicals*

Enactment of these proposals would also provide a practical working demonstration of the Canadian governments' commitments not only to the cause but also to the achievement of sustainable development. Management of rural environments and the development of the agricultural economy can proceed together in a mutually reinforcing, rather than opposing, manner.

Specific detailed recommendations

a. Agricultural and wildlife agencies increase the level of integration in programming affecting rural land use. Planning of rural landscapes should be expanded, and become more comprehensive so that habitat priorities become clearly defined. The growth of farm advisory services providing advice on financial, production and natural resource management to farmers and other stake holders should be encouraged.

b. Assistance should be provided for local groups to develop and deliver voluntary programs for rural landscape enhancement, particularly involving farmland, focussing on land that is economically marginal for crop and livestock production wherever possible.

c. The design, adjustment and delivery of agricultural production and marketing programs, including research and extension, should become sensitized to wildlife and other natural resource considerations.

d. Governments should conduct assessments of agricultural policies from the perspectives of all the stakeholders in rural landscapes not just the farmers, and use this to identify opportunities for non-agricultural income earning opportunities for farmers. The assessments should be designed to uncover the complete set of policies influencing a farmer's production decisions, and not be conducted on a program by program basis.

e. Existing and planned federal-provincial agricultural soil and water conservation agreements need to be extended in scope and time frame to provide the management vehicle through which the recommendations of this report can be implemented.

f. A decoupled income support program should be developed to replace all crop insurance and income stabilization programs. The proposals of the Grains 2000 Group provide a suitable base. Funding could be provided from existing programs, including Western Grain Transportation Act, the various crop insurance and Agricultural Stabilization Act programs. A relatively small proportion of these funds could also be used to support local programming.

g. Marketing programs should be adjusted so that eligibility or participation is based on a farmer's direct ability to supply the market, for example, grain inventory (actual or expected), not on his/her ability to purchase or rent and cultivate land. A farmer should be able to make production commitments solely on the basis of his/her ability to supply a product .

h. Farm input policies should be adjusted and expanded to provide positive support for habitat and environment objectives, and to remove unwarranted subsidies that work against these objectives.

i. Research and extension priorities, as well as other production and marketing policies, and priorities, should be reviewed and adjusted to relate to local land use priorities, and to provide a positive economic climate for the avoidance of certain farm production practices that run counter to habitat and other environmental objectives. In particular, governments should develop and implement plans to encourage farmers to maximize incomes through efficient production, reducing chemical inputs wherever appropriate, protection of health and environmental quality, and the enhancement of biological interactions and natural processes.

j. Specific programs that should be considered for adjustment include:

   i. Western Grain Transportation Act which is vulnerable to international trading pressures as long as it is structured as a subsidy, as well as unfriendly to the environment as it encourages expansion of grains and oilseed production. It is unpopular in certain areas, for example, Alberta, as long as payments are made to the railways rather than to producers. Paying the producer will probably lead to strong demands from eastern and B.C. farmers for similar treatment to their Prairie counterparts, as well as increasing the likelihood of U.S. countervail. Potential adjustments that should be considered by the Federal Government as part of the review of the policy include:

      - Use of the funds to finance a decoupled income support programs as well as habitat and environmental management programs - this would satisfy trading partners, particularly if a one time lump sum or annuity payment not tied to the continuing farm were involved.

      - Paying the producer would satisfy Alberta and other interests in diversifying Prairie agriculture.

      - Paying the producer would reduce the environmentally unfriendly aspects of existing program.

   ii. Sunsetting of other farm income support programs, particularly WGSA, and ending of Drought and Special Canadian Grains Programs, will have a severe impact on farm incomes, unless they are extended or replaced. Although the Government's response may be postponed until the situation at GATT is clearer and this year's market prospects are more certain, sooner or later it will have to show its hand. In the long run, replacement income support programs should allow for decoupled income stabilization consis-

tent with long term market trends and maintaining/ improving the environment. Such a set of programs could not be designed in time to provide income stabilization this year. Tabling the concepts for a new, environmentally friendly program at this time would be very attractive as it would serve notice to the farming community of a forthcoming change without immediately implementing it. This would allow time for full discussion and careful implementation.

iii. Crop Insurance - the amendments to the Federal Crop Insurance Act provide an opportunity to make this set of programs more environmentally friendly, irrespective of whether they are eventually amalgamated with a new income stabilization program. Legislation to amend the original Act, which is now before the House, is on a fast track, but negotiations of new federal-provincial agreements are slower. The program could be used to deny benefits where farm practices conflict with other policies or regulatory requirements for environmental protection. These instances could be identified as part of individual agreements or the federal regulations governing implementation of the Act.

v. The policies of the Canadian Wheat Board should be reviewed and revised where necessary so as to remove policies that may under all or certain market conditions provide production incentives to farmers beyond those provided by the international and domestic market conditions. It should also place grain deliveries from farms on a volume rather than areal basis.

vi. Agencies should incorporation habitat considerations into existing on farm land programs, e.g., those providing for permanent cover, community pastures, windbreaks, stream bank protection.

k. Federal and provincial governments should actively support the design and adjustment of Canadian agricultural policies so that they are all compatible with all of the four pillars of the Federal Minister of Agriculture.

l. As part of existing and new soil and water conservation agreements, as well as wildlife-based initiatives, such as agricultural programs planned for North American Waterfowl Management Plan, governments and other agencies should support, amongst other activities:

i. Research, information and advice into best management practices on a field and farm basis, incorporating environmental considerations into business-oriented decision making,

ii. Application of approaches for the regulation/control of environmental pollutants, including targets, monitoring systems, etc.,

iii. Design of incentives on the bases of the public interest in the protection and rehabilitation of natural resources, and the willingness of farmers to participate. The latter could be determined by a farmer bidding system, as used in the U.S. and by P.F.R.A. in its Permanent Cover Programs.

Delivery options for this package to be considered include, in addition to existing organizations, the use of local municipalities, conservation districts and non-profit trusts. The latter may have some distinct advantages in that they would not be tied to one bureaucracy, and would be able to lever private sector funds, for example, from agribusinesses, and wildlife and conservation organizations more easily than governments. The former, however, may have suitable delivery systems already in place.

m. Governments should determine a funding strategy for these delivery systems and their associated programming. Sources to be considered include:

   i. Existing funds of agricultural and wildlife agencies,

   ii. New moneys from private as well as public sources.

n. The Federal Government should consider allowing payments for habitat and environmental protection to be financed, partially or completely, from savings to existing agricultural programs resulting from voluntary decisions by farmers. Future savings on agricultural expenditures could be used to offset expenditures on incentive programs in earlier years.

o. Incentives to farmers for habitat protection and environmental protection should be designed to provide permanent protection unrelated to fluctuations in commodity prices. This will require use of such devices as the purchase of easements, and the provision of one time payments and annuity systems in return for long run land use commitments.

The effectiveness of these alternative approaches is not known although there is considerable experience in their use in North America. This requirement of a long term commitment reinforces the need to make adjustments to existing agricultural policies so as to remove incentives that work against protection of habitat and the environment. Policy adjustments will also provide a measure of the commitment of Canadian governments to the North American Waterfowl Management Plan.

Chapter 1
Agriculture and the land base

A recent report of the Organization for Economic Cooperation and Development (O.E.C.D.)[1] provides a broad framework for the integration of environmental concerns with the revision of agricultural policy. The report follows a commitment made by Ministers of the Organization, including Canada, that

they will: ensure that environmental policies are fully taken into account at an early stage in the development and implementation of economic and other policies .... in such areas as agriculture... and .... will promote the effective integration of these policies[2]

The same report, in the part approved by member governments, also recognizes that pressures to reform agricultural policies as a result of international trading conflicts present an opportunity through which this intended integration can be pursued. It is also interesting to note that the European experience with price support rather than income supplementing programs is similar to the Canadian one with respect to environmental impacts. Both approaches, because of their commodity focus, are considered unfriendly. In both cases, the programs provide disincentives for diversification and provide no incentives for practices which would be:

1. **Compatible with local, regional and national environmental objectives,**
2. **Considered as 'best management' in a non-distorted agricultural regime.**

Until recently, particularly before the growth and maturation of environmental and ecological disciplines, people did not think that the agriculture's environmental impacts were important considerations, or they assumed that they would work themselves out 'naturally'. What seemed good for agriculture in terms of production of food and farm incomes somehow seemed to be best for the environment and society's management of it as well. Furthermore, there was room enough in the vastness of the Canadian landscape for everybody and everything.

This study is designed to show how this should not be the response, and more importantly to offer some concrete suggestions as to how agricultural policies and programs can be changed to incorporate environmental considerations in an economically effective and efficient manner. Furthermore, it echoes the basic message of the World Commission on Environment and Development that better environmental management can be achieved through economic growth, and indeed it can facilitate long run, sustainable development[3].

The purpose of this study, then, is to bring forward a set of recommendations as to how Canadian agricultural policies can be adjusted so as to integrate wildlife and environmental concerns into the sector's development in a positive and more comprehensive way. At the same time, in order to achieve a better harmonization of environmental and developmental concerns, the recommendations are designed to be compatible with other forces affecting Canadian agriculture, particularly those of relevance to farmers' incomes, and to Canada's international

[1] O.E.C.D., Agriculture and Environment Policies: Opportunities for Integration, Paris, 1989

[2] O.E.C.D., Agriculture and Environment Policies: Opportunities for Integration, Paris, 1989, page 64

[3] The World Commission on Environment and Development, Our Common Future, London, Oxford, 1987

trade in agricultural commodities.

Wildlife issues, as this chapter will attempt to show, are not separate from farming in rural landscapes. Moreover, wildlife and agricultural programs need to be delivered together in a harmonized fashion. Otherwise, programs will work at cross-purposes to the cost of everyone - farmers will lose opportunities to benefit from opportunities to produce alternatives to commodities, and both they and society at large will suffer from environmental degradation which frequently occurs with declining quantities and qualities of wildlife habitat.

Although the farming community accepts its responsibilities towards the environment, though it still lacks practical solutions to many of its problems, one of the constraints to progress in this area relates to agricultural policies. If one was to review the policies which currently dominate Canadian agriculture without any knowledge of the attitudes of its farmers, one would still be forced to conclude, as did the reviewers of British policies almost ten years ago, that

> **The ideology is that the only appropriate use of the land is to provide food ..... and that all obstacles to that end are impertinent interferences with the proper moral order of the world[4]**

Of all the natural resource-based industries, agriculture and forestry have had the greatest impact on the landscape. Most of the so-called natural areas in the southern parts of Canada that most Canadians regularly use and rely on for recreation, water supplies, and many other services too numerous to mention, are not natural landscapes but ones structured by agriculture, even if there is not a farm to be seen today. Although much of the original land clearance may have been facilitated by logging interests, the land was sculpted, settled, and maintained primarily for agriculture.

In every agricultural area, the industry continues to dominate not only the land use but the whole ecology. The industry is by far the most important determinant of what areas remain in farming or are not farmed, what ecological niches are destroyed, modified, maintained or improved, and as a consequence what other species can survive or thrive alongside the farmer's domesticated animals and plants. Farms are the source of most of the non-point, i.e., coming from many geographical locations, changes to the physical environment as well. Soils undergo significant modification, their structures are changed, their organic contents are modified, soil surfaces are exposed for longer periods than ever before, and ground and surface waters receive considerable inputs of farm chemicals and manures. The environment responds by modifying through time the available supply of nutrients and other inputs necessary for plant, animal, and human growth.

The impact of agriculture on the Canadian environment

In both Canada and the United States there has been a growing realization and debate about the impact of agriculture on the environment. Initially, the concerns focussed more on the on-farm effects of eroding soils, salinization, declining organic matter content of agricultural soils, soil compaction, etc. although lately the debate has also included off-farm impacts ranging from the non-point source pollution of ground and surface waters from agricultural chemicals and livestock wastes, to the declining quantity and quality of wildlife habitat[5] Discussions on the issue have

[4]J.K.Bowers and P.Cheshire, Agriculture and the Countryside, London, Methuen, 1983, page 79

[5]Sources of information on these problems are growing continuously. Still current Canadian sources include:

- Standing Committee on Agriculture, Fisheries and

been dominated by the need to document convincingly the true state of affairs and to examine the scientific bases to the behaviour of soils and water in fields with a view to the development of ameliorative priorities. This bias is reflected in the accords and programs that the two senior levels of governments have developed over the past four or five years to address the issue. The focus has been on on-farm demonstration and assessment of technologies and on monitoring the potential impacts on crop productivity of soil erosion, and not so much on the factors which have led farmers to adopt environmentally unfriendly types of production.

In the absence of land-based constraints to meeting the demand for agricultural commodities, as well as the recent awareness of the significance of environmental problems, it is not surprising that soil and water erosion have not until recently become major agricultural policy issues.[6] From a policy perspective, farming's environmental problems assume more significance when the off-farm impacts are considered, for a number of reasons:

1. *They have negative economic impacts on high cost public and private infrastructures, such as dams, reservoirs, navigation channels and roads;*

2. *There is a growing public opinion that they negatively impact on most people through contamination of water supplies and, consequently, have increased considerably the chances of food production on Canadian farms having a long term, detrimental effect on human and wildlife health and productivity;*[7]

3. *Many of the factors encouraging soil degradation have also led to the destruction of wildlife habitat, either by farming-sourced pollution, or through the conversion of habitat into farm uses.*

The value of these impacts is extremely difficult to estimate, however, the limited information which is available provides substantiation that the problems are real and worthy of attention:

1. Off-farm cost of soil degradation in Ontario were estimated to be $91 million annually in the 1984[8], and in the United States. The Conservation Foundation[9] assessed the annual bill at the equivalent of Can $46 per hectare of row crop (if this held true for Canada, national costs would be $125 million or 3% of federal and provincial expenditures on agriculture in 1984). The total costs are higher in so far as permanent damage to natural resources will be occurring. As natural systems only respond slowly and with variable lag effects, these costs will continue to be felt for years to come. The estimate of costs is also likely to be too conservative because it ignores:

Forestry to the Senate of Canada, Soil at Risk, Ottawa, 1985.

- Agriculture Canada, Agricultural Soil and Water Resources in Canada: Situation and Outlook, Ottawa, 1985.

- Wildlife Habitat Canada, The Status of Wildlife Habitat in Canada, Ottawa, 1986.

- Science Council of Canada, A Growing Concern: Soil Degradation in Canada, Ottawa, 1986.

[6]Recently most governments have set up unilateral and federal-provincial working groups and task forces to address the issues. However, their published work has tended to focus on research, monitoring and extension activities, rather than on the impact of existing policies.

[7]The poor level of monitoring of water supplies and the presence of agricultural contaminants in Canada does nothing to dispell these concerns. They arise more from information on what is happening in Europe and the United States than what is actually happening here.

[8]See DCH and LRRI, A preliminary Analysis of Agricultural Land Degradation in Atlantic and Central Canada and Southern British Columbia, Farm Policy Development Directorate, Agriculture Canada, Ottawa, 1984.

[9]E.H.Clark *et al*, Eroding Soils: The Off-farm Impacts, The Conservation Foundation, Washington, D.C., 1985

i. The costs of degradation of other types of crops, which are widespread in Western Canada in particular,

ii. The secondary effects on water quality and on to the health of human and animal populations, and on rural aesthetics in general.

2. Although the proportion of the territory devoted to farming is stable or declining in Eastern Canada, recent trends have been the opposite in the Prairie Region, particularly Alberta, where soils are particularly vulnerable to degradation from the cropping practices currently in use. Agriculture's impact on the land is the single, most important reason for the disappearance of wildlife habitat in the Prairies. Currently the area being farmed is over four times the area at the beginning of this century, and almost double that in 1921. The area in wheat alone has almost doubled since 1950, and the area has increased by almost 50% since 1970. In the Prairie Ecological Region (the Prairie Provinces less their boreal forest areas) close to 90% of the land is occupied by farms[10], and in any year about 40% by cropland (by way of contrast in southern Québec and Ontario agriculture occupies about 40% of the territory, and cropland about 25%). Most of the Prairie cropland is in monoculture (over 60%) and over 25% of the cropland is in summerfallow, both of which can significantly increase the risk of soil degradation. There is no doubt that this expansion of cultivation was a response to a market opportunity and supportive government programs. Unfortunately, no off-setting incentives were available to protect the environment and wildlife, and we now face the prospect of trying to undo some of the damage this period of expansion has wrought. The North American Waterfowl Management Plan (see #7 below) identifies turning around trends in Prairie waterfowl habitat as its major objective both in terms of the scale of the changes and the resources to be committed.

3. The quantity of fertilizers sold to Canadian farmers have increased 250% since 1960. Not only has this impacted on water quality but offset some or all of the effects of soil degradation on crop productivity - a non-renewable energy source being used to mask the loss of renewable sources. Pesticide use has also increased three times over the same period, adding still more chemical load to the environment. As a result of these increases the level of agricultural chemicals found in people, animals, natural vegetation, soils and waters in most areas have risen. As Canadians tend to follow the example set in the U.S., particularly by its Environmental Protection Agency, we can look forward to increased activity to control and reduce these loadings in Canada, even where the problems' severity may be reduced by lower levels of inputs or lower population densities. Change will be driven by urban-focussed health concerns, and reinforced by international commitments, such as the Canada-U.S. Great Lakes Water Quality Agreement.

It is likely that this pressure will lead to the development of better technologies for the use of farm chemicals. In the long run the dependency of agriculture on these inputs will be maintained, even increased, even though the quantities consumed and the amount of chemical residues on food will decline. However, the substantive issue re-

[10]At the same time, of course, the areas of natural vegetation, both treed and grassed, have become smaller and more fragmented.

mains whether the existing policy framework provides adequate protection of the interests of both society as a whole and of the developers of the technology. In this respect, some proposals are presented later in this report.

4. Since 1940 agricultural soils have been stressed by the above changes combined with:

   i. Abandonment of forage-based rotations in favour of monoculture, leading to declining organic matter and other problems of soil structure,

   ii. Increasing specialization of farming such that whole areas have become dominated by crop farms resulting in less production of forages and less frequent use of forages or feed grains in crop rotations,

   iii. Excessive use of summerfallowing in semi-arid regions which has resulted in the spread of saline soils and increased wind and water erosion, and an accelerated organic matter loss,

   iv. The increasing use of larger machinery has encouraged more crop specialization, increased field size and the destruction of wildlife habitat along or within the original fields,

   v. Extensive drainage of wetlands in both eastern and western Canada is threatening wildlife populations.

5. The net result of these changes is apparent on any aircraft flight across the Prairies. Not only has the landscape become completely dominated by agriculture, but it has become ecologically fragmented and badly organized. Areas of wildlife habitat have become fragmented and isolated from each other, thus threatening the long run viability of plants and animals in any area. Surface waters have become separated from land habitat to the detriment of many animals which rely on water for breeding, safety or food. Arable fields come right down to the edge of surface waters, and chemicals and soil wash right into streams, lakes and sloughs. Livestock also graze right up to streams and lakes. Many of the trees left are found only around farms, and do not offer the privacy that many animals require. Similar problems are found in other regions, but not generally to the same extent.

6. Explicit links are being made between environmental objectives and eligibility to government support programs. For example, the 1985 Farm Bill of the United States requires farmers in identified areas to operate under approved soil conservation plans for their operations if they are to remain eligible for support under federal programs. There are indications that the next Farm Bill will extend this approach to the control of agricultural water pollution.

The Canadian Government has made strong commitments to improve the quality of environmental management. This undertaking has been reinforced by the high priority the public has assigned to environmental concerns in public opinion polls, and through support shown for media coverage of the area, and for the marketing of 'green products.'

In the United States, a report of the Nation-

al Academy of Science on more environmentally based options for farming practices[11], and the ways in which current policies for the sector actually discourage even prevent their adoption, has received wide publicity and appears to be influencing the design of the next Farm Bill.

7. Recently, Canada and the United States have agreed to commit $1 billion over 15 years under the North American Waterfowl Management Plan to rehabilitating and extending duck nesting and feeding habitat in Canada. The Plan has been developed by both Governments to address the substantial decline in duck populations resulting, it would seem, from large declines in the areas suitable for nesting in the Great Plains of North America. This decline is directly related to the expansion of cropped acreage and tracks, with a lag, the sales fortunes of the grains and oilseed sectors. The economic interest of the wildlife sector in the Canadian landscape is not well appreciated, particularly by agricultural policy makers, who should be regarding it as a potential source of funds for farm operations. On the other hand, the Plan's level of commitment, mainly in U.S. funds, pales into insignificance compared to the payments that federal and provincial governments make every year to maintain and financially reinforce current patterns of farm production (since fiscal 1981/2 annual commitments have been increasing from $3.2 billion to $6.7 billion in 1988/9 as governments have attempted to offset the financial effects of droughts and the international trade war in grains).

The issues, if we adopt a positive rather than critical stance and search for solutions, remain similar to the one outlined in 1986 by Agriculture Canada[12]:

1. *To improve the measurement and understanding of the cost of soils degradation and improvement in such a way that environmental problems can be anticipated, prevented and cured;*

2. *To provide consistent public support so that inadvertent support is not given to polluters and degraders;*

3. *To develop improved production technologies;*

4. *To find ways of redirecting funds used to treat the off-farm effects of farm induced degradation to encourage the development and use of preventive practices on farms;*

5. *To determine ways in which farmers can be offered financial rewards for habitat protection and enhancement, as well as contributing to the improvement of the quality of Canadian waters;*

6. *To find ways of resolving inter-sectoral conflicts over resource use efficiently and effectively.*

Generally, programs that have been developed to address natural resource protection issues in agriculture have not contained adjustments in existing agricultural policies. The result, as will be explained in the next two chapters, has been that resource protection programs have been left 'to fight it out' against the frequently opposing forces stimulated by one or more agricultural policies designed to remove production and mar-

[11]Committee on the Role of Alternative Farming Methods in Modern Production Agriculture, Board on Agriculture, National Research Council, Alternative Agriculture, National Academy Press, Washington, D.C., 1989.

[12]Agriculture Canada, Agricultural Soil and Water Resources in Canada: Situation and Outlook, Ottawa, 1985.

keting constraints. Later in this report evidence will be produced that the financial impact of these policies can be significant. For example, Prairie grain and oilseed producers have received $20 to $40 per acre assistance from the governments for their crop each year. The policies and programs involved have the effect of increasing the cost to the farmer of habitat and shelter belts on his farm by this amount per acre per year. Consequently, agricultural policies must be evaluated as first priority in steps to offset persistent habitat loss. Policy adaptation must come first or at least be integrated with incentives for natural resource protection and rehabilitation.

Conclusions

There are three inter-related areas that require more work and increased levels of understanding and support. First, the inter-relations and interests involved in any agricultural landscape need to be more fully explored. The display on the next page is a preliminary attempt to lay out some of the more important factors involved. However, the contents of this list needs to be evaluated and each of the entries made more specific. Secondly, agricultural policies, programs and projects need to be assessed from a broader perspective than the production of food and farm income if all the interests involved in agricultural landscapes are to be given just consideration (see, for example, the backgrounder on drainage policy on this page). Finally, agricultural policies will need adjustment so as to be supportive of these other interests as well as its traditional ones, and it is this issue, in particular, that the rest of this report is concerned.

Backgrounder on Drainage Policy

Farm and off-farm farm drainage has generally received government assistance. Currently, most of the original wetlands in farming regions have been substantially modified if not eliminated by drainage. Most assessments of drainage proposals have two serious shortcomings.

1. **They generally use farmers' receipts and expenditures that have not been corrected for the public subsidies involved,**

2. **They incorporate no economic values for wetland retention.**

Canada, as does the United States, should no longer accept the first practice and address the second issue as a priority. Although the lack of commodity specificity in most drainage programs may protect them from countervail under CUSTA (the Canada-United States Trade Agreement), without these changes they will be inconsistent with the commitments of the North American Waterfowl Management Plan.

Finally, drainage proposals should be subject to independent, objective review procedures which consider the full range of functions provided by the existing and the intended environments.

When Looking at an Agricultural Landscape

From the Point of View of Plants and Wildlife, Consider:

- the supply of habitat providing food and shelter for different species
- the supply of suitable locations for different plants
- the interrelationships between plant and animal species
- the supply of habitat for breeding (areas for nesting, spawning, etc.)
- the range of plants and animals that can be supported
- that the diversity of sites and food supplies available will directly effect the ease with which populations can survive challenges brought on by droughts, poor winters, diseases, etc.
- the connectivity of sites as many species depend on one environment, for example, wetlands, for one part of their life cycle and surrounding areas for another, for example, wetlands for breeding or protection, surrounding areas for food or nesting
- how easy it would be for individual members or small populations to interact with others - isolated populations tend to be more vulnerable to disease, over-predation, other natural disasters, etc., than ones who are in contact with others or who can move to other locations

From the Point of View of Soil and Water Management, Consider:

- wetlands form a crucial function stabilizing water flows throughout the year
- areas of surface water are particularly vulnerable to erosion and pollution if cropping and animal grazing is practised along their edges
- intermittent water courses are particularly vulnerable to erosion if they are cultivated
- cultivation close to the edges of water bodies in dry areas increases the risk of salinization of soils
- water runoff on fields after storms or during snow melt needs to be carefully managed so as to minimize the potential for erosion through the use of permanently covered waterways
- areas of permanent vegetation can provide protection for land areas from the effects of wind and water erosion
- wildlife habitat, through the birds and insects that are supported, can play a considerable role in controlling agricultural pests

From the Point of View of the Economics of Farming, Consider:

- were it not for government programs, some areas would provide a low even negative economic return from being in cultivation
- farms can cover up to 80 to 90 percent or more of the area of many parts of Canada

From the Point of View of Society as a Whole, Consider:

- water and soil erosion on farms does impose significant costs on society as a whole - these include not only monetary costs such as the silting up of water ways, but loss of water quality, through acidification and the introduction of traces of pesticides, which can impact on plant, animal and human health, and also so alter landscapes, for example, by encouraging the growth of algae, that the quality or aesthetics of areas become significantly damaged
- no incentive is offered to farmers to maintain or increase many forms of wildlife habitat while incentives are still provided to them to destroy or to modify it, for example, grants or tax incentives to clear land for cultivation or to drain wetlands
- Canadians, indeed North Americans in general, attach a great deal of importance to improving the way natural environments are managed and to the value of rural landscapes as places of beauty and recreation
- the diversity of Canadian landscapes and wildlife habitat cannot be preserved simply through creating more reserves and parks, and most gains in the supply of quality habitats will have to come on lands in private ownership such as farms

Chapter 2
Agricultural policy and the environment

Farming is not like most industries. Production is quite uncertain in many instances and markets are not very secure. There are many producers all attempting to access relatively few markets where prices are frequently determined by few buyers heavily influenced by government policies. With the exception of supply managed commodities - for example, dairy products, poultry, and eggs - and some other sheltering behind border protections - for example, vegetable products in season - Canadian producers find themselves trying to sell to a market where price is determined by the United States or the European Common Market, and where their share of total supply is quite insignificant. In the absence of alternatives, producers quite naturally are liable to respond to downturns in the market - either prices or demand - by producing more before eventually cutting back on output. They have to operate in this manner so as to maintain income and survive and grow, as they cannot control or influence the market price in order to survive and grow. Needless to say government involvement in the sector, itself, is quite an industry.

While not going so far as to agree, in the Canadian context, with the conclusion that British and Common Market agricultural policy

> **totally invert(s) what would be economically and socially desirable**[13]

it does seem that there are significant gaps in the breadth of coverage that have resulted from increasing governmental involvement in the sector since the Second World War. The gaps are so wide that one questions the economic efficiency of it all.

The major reasons why, in a market oriented economy, governments should intervene are to provide goods or services that are not efficiently produced by the market or to reduce the importance of undesirables that the market would otherwise produce. As a consequence, governments across the world have invested much in supporting the farmer's income as he navigates the unpredictable and adverse agricultural market universe[14], sometimes to the detriment of the environment. Agricultural policy makers generally have failed to include the full basket of goods and services that farmers provide in their policy deliberations.

Almost every farmer receives subsidies to provide goods that do have a commercial price - agricultural commodities, even those in surplus supply - but few to provide those that do not - for example, wildlife habitat[15]. This appears to be the equivalent of subsidizing General Motors to build private cars but not buses to address traffic congestion. Of course, the reason why such an apparent inconsistency exists is because farm income support is provided to reduce the risk and avoid the costs of the industry being

[13]J.K.Bowers and P.Cheshire, Agriculture and the Countryside, London, Methuen, 1983, page 2

[14]It is also true that in some countries agriculture is used to subsidize other sectors. This is particularly the case in some less developed countries.

[15]Other policies, for example, wildlife programs, may attempt to provide this, but they are only successful to the extent that their effects can overwhelm the opposing effects of farm subsidies which encourage farmers to increase production through maximizing the area in crops.

bankrupted by short lived circumstances[16]. But then, as we shall show, this action only goes to increase the likelihood of another important external cost, that of environmental degradation [17].

Agricultural policy makers have been frustrated by the environmental question. The lack of market signals, an issue which they have tended not to address, are used to indicate a lack of any ability to address the question, a situation so well summarized by a skeptical or frustrated, French source:

> **If prices are low, farmers cut the hedges to sow more seed: and then the wind blows and the land is spoiled. And if prices are high, farmers cut the hedges and sow more seed; and then the wind blows and the land is spoiled [18]**

Canadian agricultural policy, like those of its Western counterparts, has focussed on removing so-called supply constraints on domestically produced farm commodities, and to protect the long run financial viability of the owner or family operated farm. The latter has been addressed a number of ways, particularly through income stabilization programs and price support mechanisms, that have been commodity focussed. This has brought an almost total commodity focus to Canadian policy. The key dependent variables have been quantities sold and producer returns from the production of specific commodities. Less attention has been paid to the economics of joint production and mixes of commodities, and to the economics of addressing external cost issues. This bias has extended throughout the sector including the focus of farm lobby groups and agricultural research. The system has become fixed on a focus of:

1. Expanding production shares of specific commodity markets,

2. Finding substitutes to lower farm input costs for specific commodities and/or

3. Raising the productivity of specific methods of producing single commodities,

always assuming that increased specialization of production is desirable. Less attention has been paid to the ability of the natural resource base to support farming nor to the opportunity costs of focussing solely on serving individual agricultural commodity markets.

This discussion has exposed the nub of the issue - agricultural policy has tended to ignore the environmental implications of its farm support policies, and, more significantly, it has not addressed how to prevent them working at cross purposes with other objectives for rural areas.

The opportunity cost argument has two important and inter-related dimensions. First, there is the issue of determining what benefits and costs should be included in assessments of options. Recent experience with environmental problems and disasters suggests that generally the net should be cast wider than in the past, so that in our case the potential impact on natural

[16] It is, of course, easy to criticize and the intent of so doing in this paper is only to create a market for policy revisions. Existing agricultural programs were not intended to have a detrimental environmental impact, nor was it thought that such an issue was important when the programs were implemented. Moreover, the current high level of expenditures under the existing policies reflects current market conditions and growing conditions particularly for grains, and it is not the intent of this report to suggest that this priority was misplaced. Rather, with the advantage of hindsight, there are other possibilities that might have accomplished the same as well as additional objectives.

[17] It is probably true that financially stressed farmers trying to maintain their operations will stress the environment, but in the long run farmers reducing the scale of production or abandoning all or part of their operations may, in fact, be good for it. Not that this is being proposed as a solution as it would only substitute one problem for another. However, some movement in this direction can be expected, especially when one considers how much production may be supported only by government payments. The second Appendix gives some examples.

[18] Quoted by H.Corbett, 'Multilateral Negotiations on Agricultural Trade,' in B.Davey et al, Agriculture and the State, London, MacMillan, 1976, page 21.

resources, and on animal and human health, as well as farm incomes, can be assessed. Second, little attention has been paid to alternative means of realizing income from farm operations other than from food and fibre production.

The net benefits of many changes in Canadian agriculture have also been overstated because the value of increases in output or sales have included the effects of government subsidies farmers receive or benefit from (Chapter 4 provides examples of grain and oilseed farmers whose cash farm incomes in 1986, 1987 and 1988 were heavily dependent on government payments - in some cases to over 100%). The public costs that are ignored may also be significant, they include:

i. off-farm costs stemming from production practices, including loss of potential returns from other uses, the impact of soil and water degradation, and

ii. the loss of the net returns of other potential uses of the funds used for subsiding the farm production.

In fact, as will be discussed later, the current set of farms policies increases the distortions. They so alter the price regime under which farming operates that certain types of production are favoured beyond their level in an undistorted commodity market in such a way as to increase unpriced, off-farm costs while priced on-farm costs are lowered. Under these circumstances, production can easily develop in socially undesirable directions, and it will require sizeable incentives to encourage farmers to change.

The case of agricultural drainage has already been noted but the issue is more broader than this. The set of policies under which farmers, particularly in the crop sectors, have operated for years has been designed to address trends towards more and lower priced production of agricultural commodities, combined with stabilization of gross market returns. The resulting system of incentives, as will be reviewed later, has encouraged heavier use of farm inputs, particularly chemicals and machinery, and more cropland. Both of these trends have led to declines, both in quality and quantity, of wildlife habitat, increased rates of soil erosion, increased water pollution, *etc*. The resulting set of farmer benefits have been priced into the farm business, the resulting set of public losses and costs have not.

It is unlikely that this approach towards the development of the sector is sustainable, and it is probably in the long run interests of those in and outside the industry that it is not. The major pressures for change are likely to be:

a. **International and domestic pressures, to remove subsidy distortions to trade in agricultural commodities.** In many commodities, particularly grains and dairy products, when all the expenditures by taxpayers or consumers (because of inflated market prices caused by government policies) are taken into account, resolution of competition between different national groups of agricultural producers has become more a question of the ability of governments to find money in their exchequers or to squeeze it from consumers than of the efficiency of commodity production. As long as production of agricultural commodities remains sufficient to meet world supply requirements, this will remain an issue, and the signs are that supplies will be sufficient at least for most of the 1990's[19]

[19]This is not to claim that everybody in the world will be able to satisfy their food needs. Some areas will receive inadequate supplies because of delivery problems, war and

The Canadian taxpayer is becoming better informed of the extent of agricultural subsidies both on Canada and abroad. To these growing pressures for change can be added those coming from various trade negotiations. CUSTA has introduced a greater U.S. interest in the circumstances of Canadian farm production for the Canadian as well as the U.S. markets than ever before. American farmers face the same economic pressures as their Canadian counterparts. Farmers producing for export markets will continue to be affected not only by trade wars between the United States and the European Common Market over agricultural commodities, but growing pressures, led by the International Monetary Fund and the World Bank, for a liberalization of agricultural trade so as to remove a major constraint to Third World development.

The Canadian position in trade discussions has been to support and at times join the leaders in moves to liberalize trade. In the case of agriculture, it has pressed for an end to trade wars and export subsidies which have reduced the competitiveness of Canadian producers, and imposed severe financial penalties on the Canadian population as a whole as income protection is provided to penalized farmers.

b. ***Pressures from continuing efforts by Canada, the United States and many European countries to reduce governments' deficits and national debts*** - Not only will this result in extreme pressures to reduce program expenditures,[20] but it will maintain interest rates at relatively high levels. Farming is now very dependent upon credit not only for capital investments but also to finance operations until sales of produce are realized. Credit costs will also remain high as long as inflation is perceived as a threat. These monetary objectives will result in high real interest rates (the difference between the rates paid for credit and the rate of inflation). This will continue to force farmers to adopt a short run perspective in making investment decisions. Decisions to invest in resource conserving practices, other things being equal, will be more difficult to rationalize over the short run than when real interest rates are lower. It probably will, however, lead, along with other financial pressures, to lower land prices than would otherwise be the case. This will be positive for conservation, as there will be less economic justification for increasing farm inputs and raising farm outputs on a per unit of land basis, and this will make alternative land uses relatively more financially attractive.

c. ***Rising social pressures from within and without the farming community for agriculture to demonstrate more concern for the impact of agriculture on the environment.*** While this could lead to more negative pressures on farming with more regulations and costs being imposed upon farmers, if it is handled carefully it can present opportunities for the sector. It can legitimately be argued that the current position of Canadian farmers is not just of their making. They have to operate in a business environment largely determined independently

pestilence, and in others government policies will be such that farmers will not receive the just returns from farming necessary to support required levels of production.

[20]A possible solution to this problem is to transfer the costs of support from the taxpayer to the consumer through managed market prices. Not only would this be a socially regressive move, but it would be politically unacceptable. Domestically, there is already considerable opposition to marketing boards. Internationally, such a move would replicate the policies of the European Common Market and Japan. This would be contrary to the position of Canada in trade negotiations, and to CUSTA and the objectives of the Cairns Group of agricultural export nations, of which Canada is a founder member, as well as GATT.

of them and upon which they can have very little effect. **Consequently, it is a legitimate use of public funds to support farmers to protect and improve the environment.** Such an approach may in fact have positive long and even shorter run implications for the economy as a whole as the negative economic impact of environmental problems caused by farming would be reduced. Furthermore, it may be possible to lever private funds to support this activity from groups who would benefit, thus providing farmers with a new basket of priced commodities to include in their farm operations, for example, pollution controlling land uses, wildlife habitats, hunting and recreational areas.

Recent Federal initiatives respecting agriculture and the environment

Both the Ministers of Agriculture and Environment have announced within the past six months initiatives covering, amongst other things, agriculture and the environment. The Minister of Agriculture's Policy Review has as one of its pillars Environmental Sustainability[21] - though it is being interpreted, it would seem, as covering only issues within the farm and the human food chain. Intersectoral issues, such as habitat supply on farms, do not appear to be a priority. Nor does it seem any different for the Minister of the Environment, whose recent Green Agenda follows his colleague's approach to agriculture, and mentions no cross-interests in his section on wildlife[22].

[21] Agriculture Canada, Growing Together A Vision for Canada's Agri-Food Industry, Ottawa, 1989

[22] Minister of the Environment, A Framework for Discussion on the Environment,, Ottawa, 1990

Chapter 3
Towards a framework for evaluating existing Canadian farm support programs

There are many programs offered by the Federal and the Provincial Governments which have a direct, positive impact on farm income. In fact, there are too many to review each in turn, and instead a more general approach, along with the use of some case studies by way of example, are used to explore the ways in which farm policies can positively or negatively affect the supply of wildlife habitat and the quality of environmental management on Canadian farms.

Since there are some significant lags in the system we have been analyzing, the environmental effects of current and previous farm practices are still accumulating and may not yet be apparent, making the monitoring and assessment of the real situation extremely difficult.

Strict enforcement of the burden of proof before policy adjustments can be made may in fact be the most environmentally unfriendly act of all. This is particularly true on an individual policy basis, as the combined effects of policies cannot be readily disaggregated (see the next to last section in this chapter). Proof based on historical evidence has to be replaced at least in part by a more subjective requirement based upon assessments of acceptable and unacceptable levels of risk of both prevention and no action. Furthermore, at times a distinction must be drawn between factors that cause problems, and factors that prevent resolution of problems.

There is no doubt that the favourable market and general economic circumstances of grain farming in the 1970's led to the ploughing up of much of habitat in Canada, and has increased problems of environmental degradation. This fact, along with the lack of incentives to do otherwise, may be the cause of many of our environmental problems. The solution to them in the 1990's requires that existing programs be reviewed, adjusted and supplemented so as to provide a rational set of incentives in support of change in farm management and land use as well as the continued development of the farming industry. Programs that did not cause the problems indeed are constraints to their solution. Consequently, a number of examples of the ways in which current policies reward environmentally undesirable practices are given in this chapter in order to indicate how current policies will constrain desirable changes in the future, and not necessarily to explain the evolution of the present circumstances.

In this review, farm support programs are classified into a number of types:

1. **Farm income support programs** through which payments are made to producers according to actual or inferred shortfalls between prices or crop yields and some actuarially determined norms or averages. They are designed to protect the income of farmers from most of the income effects of short term declines in commodity prices or of the effects of adverse weather and other 'naturally' occurring events that depress crop yields.

2. **Farm input subsidies** whereby costs to farmers of specific inputs do not reflect true market prices as prices are subsidized or partial compensation of costs incurred are paid

by governments.

3. **Market policies and programs** are designed to present barriers beyond reasonable transport costs to competitors accessing markets, or to subsidize and otherwise assist domestic producers competing in them, for example, export, markets. This category also includes marketing arrangements, such as supply management, that allow producers to realize greater than 'free market' returns based on their oligarchic or monopolistic control of the market. Not only does it include tariff protection and direct market controls, but the indirect advantages that animal health and product quality controls can give. It also includes many of the programs of the Canadian Wheat Board.

4. **Research and information dissemination programs** designed to improve the competitiveness of farming through the development and scientific presentation of new technologies and management systems.

5. **Programs to support on-farm innovation** through the subsidization of evaluation studies and on-farm trials, and early innovation.

The potential impact of each type of program on the use of the environment is reviewed below. In addition to these programs various agricultural and wildlife agencies offer farm programs designed to enhance not only the supply of wildlife habitat but to address other farm-induced degradation of the environment. These programs account for a small proportion of governments' efforts to support agriculture, particularly when measured in terms of either expenditures or their impact on farm income, and valiantly operate against the tide of other farm initiatives. Consequently, a review of these programs is postponed until the total impact of policies and programs inadvertently operating to lead farmers in opposing directions are reviewed.

Most of the conclusions drawn about the actual or potential impact of existing policies for agriculture are not new, but to improve readability of the report references are not given on every point that is made. Instead readers are referred to the references in the footnote below as well as those given in footnotes 1 to 8 on pages 1 to 6 for corroborating information [23]

Farm Income Support Programs

Most farm income support programs are designed so that payments are based on crop yields or prices. In the majority of cases, it is irrelevant to this review whether the programs support prices or yields since both when multiplied into the area devoted to a crop give farm sales, through which both factors have their impact on the farm business. In the case of livestock, yield variability is not supported by programs generally, though some form of protection may be offered for feed crops or for very specific, but assumed to be spasmodic and catastrophic, circumstances, for example, infectious diseases or drought. Programs of a temporary nature should not affect long term trends in land use, except to at least partly negate short lived, catastrophic events.[24]

[23] D.Scheiser, A Study on Soil Conservation, report published by the Saskatchewan Wheat Pool, 1987; E.Pigeon, How Specific Policies May Impact on Prairie Soil and Moisture Conservation; J.W.Atcheson, Prairie Agricultural Directions. The latter two publications were published in 1984 by the Farm Development Policy Directorate, Agriculture Canada.

[24] However, it must be noted that most payments for disaster assistance in Canada in recent years have been made in the Prairies for droughts which although unpredictable are probable (even two successive droughts are a reasonable statistical probability, though a third is unlikely). Some of the disaster relief payments, and the expectations that others will follow droughts in the future may act to maintain what would otherwise be too risky a venture.

The importance of government payments to farm incomes can be appreciated from Figs. 1 and 2, and from data on the incomes of individual farms presented in Chapter 4. It varies from region to region depending on the mix of commodities produced, with the highest dependency occurring on the Prairies, where wildlife habitat is in most short supply and where many of the effects of soil degradation are most severe. The forecast decline in government payments in the 1990's reflects the termination of existing federal programs. This provides an opportunity to substitute a more environmentally friendly approach to income support in the future.

It could be mistakenly claimed that, wherever yields or prices are determined independently of farm income support programs, the environment's impact on yields will be reflected in the payments made through them. Thus farm income support programs are generally claimed to be 'resource neutral', a position that is now examined in some detail[25].

Canadian farm income support programs as currently practiced are designed to provide payments to participating farmers when their incomes are expected to fall below a base level determined indirectly by average yields or directly by commodity prices usually over the previous five years. Farmers generally only pay a portion of the costs of operating the programs. Consequently, farm incomes are increased through these programs above those that would otherwise be expected in the long run, providing governments pay a substantial part of the costs of the payments made to farmers. If this was not the case, income support programs would only have the effect of redistributing farm income between years.

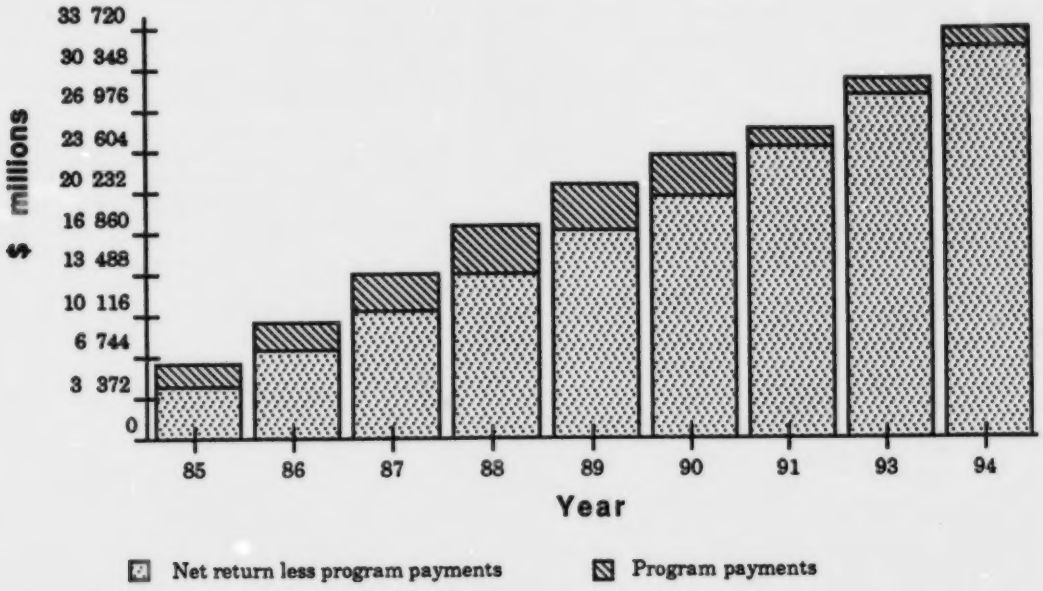
The Federal Government is the major contributor of farm income support programs - its expenditures were $0.5 billion in fiscal 1982/3, increased to $3.6 billion in 1987/8 and fell to $2.2 billion in 1989/90. Because of the effective termination of some programs (Special Canadian Grains and Western Grain Stabilization Assistance), and the lack of any compensatory moves to date, expenditures in the next fiscal year are forecast to be only $1.2 billion. This contrasts with the 15 year cumulative total expenditure target of $1 billion for the North American Waterfowl Management Plan.

In order to realize this 'premium' from government programs, farmers are encouraged to increase areas in production, the basis of eligibility under crop insurance and most *ad hoc* disaster relief programs, or to increase output for price stabilization programs. The best way of maximizing eligibility for both types of program is to maximize output on the maximum area of land. Neither of which may make economic sense if the programs were not available, and areas in production and total output would be smaller.

[25] For similar conclusions the reader is referred to two papers presented at the Sixth Annual Western Provinces Conference on the Rationalization of Soil and Water Management held in Winnipeg on November 28-30, 1988:

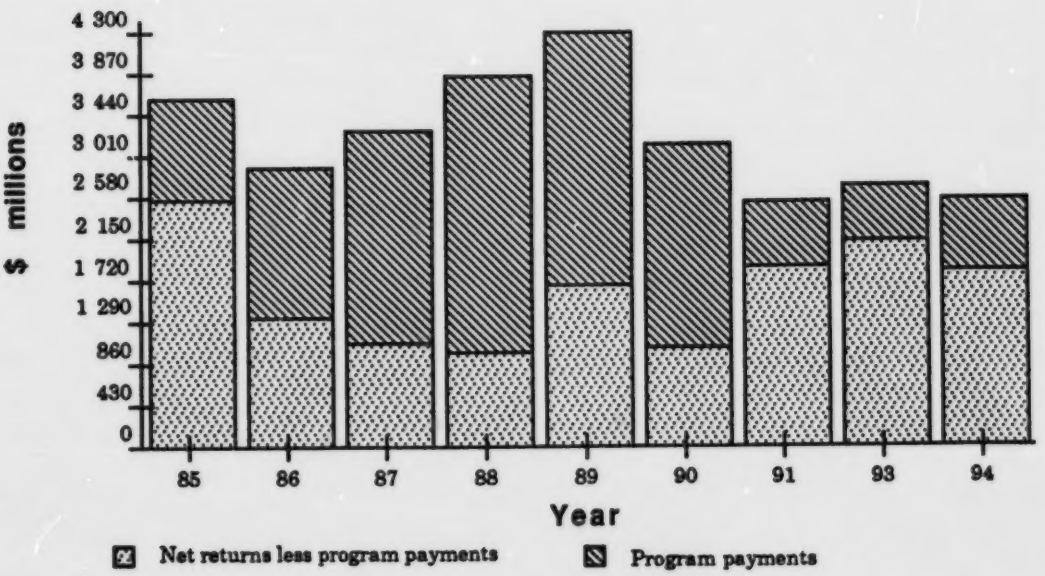
H. Tolton, Crop Insurance

H.Furtan, Agricultural Stabilization Programs



Source: Agriculture Canada, Medium Term Outlook, Ottawa, 1989

Fig. 1 Realized and Forecast Aggregate Farm Incomes - Canada, 1985-94



Source: Agriculture Canada, Medium Term Outlook, Ottawa, 1989

Fig. 2 Realized and Forecast Aggregate Farm Incomes - Western Canada, 1985-94

Maximizing the area in production has the effect of encouraging more land in cultivation than would otherwise be the case. However, its effects cannot be viewed independently of other programs. For example, in the Prairies grain and oilseed production is encouraged relative to livestock production by the Western Grain Transportation Policy (see the section on Marketing Programs). As price stabilization programs for the livestock sector have not been as well developed as those for the grains and oilseeds sector (Western Grain Stabilization Act), these effects are only reinforced by commodity price stabilization policies resulting in a greater expansion of the area of crops in the Prairies than would otherwise be the case, more monoculture, and the loss of habitat (livestock operations can support more habitat, if only because habitat is not such a barrier to nor is it so modified by farm operations).

The area under crops may also be increased by crop insurance programs applying average yields for an area to individual operations to determine damage entitlements. This means that the half (approximately) of the farming population not gaining an average yield are more favoured than the other half both for premiums and for payments. This should encourage the more inefficient to grow crops (usually spring sown annuals) at the expense of the more efficient farmers and the tax payer. Adoption of coverages based on individual's performance would be more friendly to the environment, and has or is being adopted by some provinces. If all adopted this would be a positive measure as a combination of higher levels of farm receipts with lower inputs on a land area basis would be encouraged.

The increased stability and size of farm incomes that farm income support programs in general provide will:

a. Allow for the operation of farm units and the farming of areas of land that would otherwise not be so economically viable,

Governments should evaluate whether coverage based on individual risk accounts should be a regulation or requirement of all future federal-provincial crop insurance programs and agreements. Similarly, they should avoid offering reduced premiums in high risk farming areas as have existed, for example, in Alberta. Such a practice can support crop production in otherwise marginal areas. Combined with land clearing incentives, crop insurance under these circumstances, can also encourage destruction of land otherwise suitable for habitat and not crop production, and is contrary to habitat objectives under the North American Waterfowl Management Plan.

Governments should also consider offering extended crop insurance coverage to cover farmers against all naturally occurring threats to crop yields, including the effects of weather, pests and wildlife deprivation not limited to waterfowl.

b. Increase returns to some operators so that they are encouraged to add more land to their operations, and encourage the management of the farm business so as to maximize receipts from programs as well as net returns from the market,

c. Encourage a higher levels of inputs, for example, chemicals, than would otherwise be the case as the costs and risk of farming operations are reduced.

However, a still greater distortion of 'resource neutrality' probably results from the fact that not all commodities have been equally supported by farm income support programs, thus encouraging more production of eligible commodities than would otherwise be the case. In gen-

eral, this means when the effects of income support programs are combined with those of market and transport, that cash crops, such as wheat, have been unduly favoured by Canadian farm policy than specialty crops, for example, pulses, and less marketed crops, such as fodder crops, and livestock production. The net result being a less diversified agricultural landscape, less rotation, greater areas cleared and in annual crop production, and a heavier application of chemicals[26] than would otherwise be the case.

In addition, the design of the income support programs, with a substantial public financial contribution for no apparent public return beyond that associated with a more stable farm income from selected crops, supports a substantial and unconditional income transfer from the non-participating sectors of the economy to selected farmers. In the final analysis, the public is financially encouraging farmers to produce crops that are, at least in some locations, environmentally unfriendly.

This latter point raises the issue of cross-compliance, or whether eligibility for one or more program should be conditional upon the achievement of other conditions, for example, adoption of approved management practices. This approach has been used in the United States since the enactment of the 1985 Farm Bill, and the indications are that its use will be extended in the new Bill due this year or next.

Canadian farm support programs can also be criticized from the international trade policy perspective for operating as a farm subsidy. To the extent that farmers do not have to pay the true costs of the programs they may be considered subsidizing. However, the real issue is not the subsidy but the extent to which such subsidization gives Canadian producers an unfair advantage in the international market place because they can remain in business with a lower market price than would otherwise be the case. It then becomes an issue of countries 'trading off' their programs against those of other nations. Since most countries have farm income protection programs it is unlikely that these would be adjusted unless there were some additional reasons, such as the environmental concerns we have been voicing.

The lack of preventive environmental objectives in Canadian farm income support programming, as in other aspects of Canadian farm support policies, may undermine Canadian efforts to negotiate favourable resolution of international environmental issues, such as acid rain. Some countries, and particularly the United States, have large, visible farm conservation programs that include requirements that make eligibility for income support payments a direct function of compliance with requirements for conservation, including avoidance of draining identified wetlands and avoidance of cropping in identified erosion prone areas[27].

In relation to CUSTA, in particular, it is also important to note in passing that income protection through the types of subsidies that we have been reviewing , as well as those of the next two sections (input and marketing subsi-

[26]This has been reinforced by government subsidies for fuels and fertilizers - see the next section.

[27]This positive comment, however, must be qualified. The commodity price support policies of the U.S. probably have a greater negative impact on their environment than the Canadian programs providing farm income support has on ours. It also must be stressed that the recent size of expenditures for the Canadian programs is in part a result of the U.S. policies and programs. Thus the Canadian environment can be said to be suffering under the impact of programs triggered by the U.S.-Common Market 'Trade War.' On the other hand, there are alternative, more environmentally friendly ways that both countries could use to provide income support to farmers.

dies), does not encourage the low cost, high productivity production required to be immediately competitive in markets, especially over-supplied ones, when subsidy or border protection is removed. Although many agricultural subsidies are protected in the short run under CUSTA, the fact that both parties have made a commitment to review jointly the definition of what makes an appropriate subsidy has only postponed the decision. Leaving adjustments until after decisions on the reduction of unacceptable subsidies will leave the farming and the related agri-business sectors very exposed to American producers operating at lower costs through a combination economies of scale and agglomeration, and the advantages of warmer climates.

Regarding cross-compliance:
There is no substantive evidence that what may seem to be a theoretically valid approach has widespread practical merit without a program of incentives for habitat supply and environmental protection. It is a regulatory approach to environmental management, and regulations are expensive to enforce except amongst small populations relative to the taxpaying base. However, it also does seem that, as farm income programs, particularly, crop insurance, do provide support for explicit production decisions, it seems only reasonable to identify and not support circumstances where these production decisions have an unacceptable social cost. As premiums that farmers pay are adjusted to reflect estimates of the production risk involved, the decision has already been made that such programs should not treat farmers equally. It would seem a small step to establish ineligibility criteria based on habitat destruction, for example, drainage of wetlands, through making a connection between the administration of municipal assessments and taxation, and crop insurance.

It should also be noted that whereas some Canadian commentators are somewhat optimistic about the size of future demands for agricultural commodities [28], these conclusions have generally not been influenced by forecasts of production capabilities of existing or future competitors, nor do they consider the impact of changes in the productivity of farms in relation to land inputs. On the other hand, advisors to the United States Department of Agriculture on the new Farm Bill are adopting a more pessimistic position regarding U.S. agriculture and forecasting the need for a declining area in crops over the next one to three decades. If this were to become a reality one could be sure that U.S. interest groups would launch strong campaigns against Canadian production in order to attempt to maintain market share.

To the extent that one accepts that the root of the environmental problem in farming is a consequence of society not having an economic system in place that allows for a full incorporation of environmental concerns in the costs and returns of farm operations, the two issues are in fact the same. In both cases, farm income programs can be accused of providing some producers with an unfair advantage in the market place, whether it is a question of competing farmers, or competition between sectors. Already there are signs that environmental issues will be brought into discussions on international trading regimes for agricultural products - should producers and governments investing in the protection and enhancement of the environment be put at a competitive disadvantage, either in terms of sales or net public and/or private returns, compared to others who are maximizing output and returns in the short term with less regard for the longer run impact on the environment?

These considerations point to the potential payoff of beginning a process of adjustment away

[28] See, for example, J.C.Gilson, World Agricultural Changes: Implications for Canada, C.D.Howe Institute, Toronto, 1989.

from existing income subsidies sooner rather than later. How this could be done to the advantage of both the general public and the farmers will be considered later.

At this point certain broad conclusions about Canadian farm income support policies can be made:

1. *Probably most farm income support programs could be adjusted so that they are supportive of environmental objectives, but this would involve adding additional conditions or rules to reduce the coverage offered and/or to increase farmer premiums where the risk of environmental degradation is relatively high .*

2. *The fact that most programs do not operate on a cost recovery basis from farmer premiums means that included commodities will offer a higher net return or income than would otherwise be the case. More land will be used in agriculture and the opportunity cost of land in habitat will increase (see the discussion of land rents in Chapter 4 and in the Appendix). The extents of the increases should be investigated if the decision is taken this summer by Ministers of Agriculture to continue with the existing framework of farm income support programs, and not to offer expanded cropland to habitat conversion incentives as will be recommended later.*

3. *There are not likely to be significant international pressures to adjust Canadian farm income support programs unless they are to be part of a coordinated, multinational trend, or as part of the follow-up CUSTA negotiations. In the latter case, they could be drawn into a debate about pollution as a subsidy and used to offset Canadian concerns over U.S.-sourced acid rain, particularly as the U.S. can legitimately claim that its farm support programs do include more significant environmentally friendly components than Canada's.*

4. *Restricting the range of crops included in farm income support programs may have diminished the attractiveness of excluded crops. For example, currently it may have increased the income risk of growing perennial crops or pulses in the Prairies. Today, the bias is less strong, though of course farm production regimes will change more slowly than policies can. Crop insurance coverage is complete for the major crops, and income stabilization schemes are becoming more comprehensive. However, the livestock sector, the economic base for perennial crop production in Canada, still receives less income and risk stabilization (red meats stabilization programs are a recent introduction, and forage insurance programs are not as well developed as those for marketed crops). Perennial forage crops offer more opportunities for wildlife habitat than annual ones. The public benefit from this selectivity is not clear. When combined with the effects of selectivities in other programs considered in the following sections, the costs include more monoculture and a less diversified agricultural landscape, and, perhaps, more land conversions into farmland and more land retained in farming than would otherwise be the case*

5. *There is an opportunity to satisfy the environmental goals of both farmers and the general public by providing mechanisms in Canadian agricultural policies for generating farm income from the on-farm provision of environmental goods and services, such as*

habitat, (see Chapter 4 for a review of some actual examples of habitat programs). The public costs of such programs can be offset by savings in agricultural programs - Chapter 4 provides strong evidence of this. In addition, the public benefits of having more habitat are probably greater than the agricultural production obtainable from the same area as commodity markets are well supplied. The next chapter considers this point in more detail.

6. *Introducing a new farm income support program that is not commodity but environment specific would seem to be an option with high potential. Producers would be covered for income risks associated with their own realized sales of marketed crops of all kinds ensemble. Constraints to crop diversification would be removed, as would any incentive to arrange production to increase the level of eligibility for program support - this would depend purely on the ability of the farmer to meet market requirements and the quantity of production that was sold[22] Key issues to be resolved would include delivery responsibilities, financing requirements and responsibilities, definition of commodities covered (they should be comprehensive), whether membership should be compulsory or not, and how to treat new entrants to farming and those expanding or contracting their operations. Payments would not be considered as a subsidy if there was no commodity orientation except to determine what expenses and sales would be included in the calculation of farm income. The level of public subsidy would also be an issue, as well as how the impact of a series of catastrophic events, such as the droughts and price falls that have recently beset Prairie farmers, would be dealt with so as to maintain program viability.*

7. *Although the introduction of a comprehensive, decoupled income support program would from an economic perspective eliminate the need for crop insurance, the latter seems such a valid component of Canadian farm support policies that it would seem likely that there would be strong pressures to allow it to continue. In this case, regulations should be introduced requiring it to be delivered on an individual not area risk basis, with premiums determined according to actual risk, actuarially sound, and governments' premium contributions not being available where they would be inconsistent with other public objectives, as, for example, under the North American Waterfowl Management Plan.*

8. *The key requirements for future farm support programs having a direct income impact on farmers are:*

   a. *If at all possible, decouple from commodities, and*

   b. *Never put government payments for farm income support programs on an areal basis.*

Farm Input Policies

Policies and programs that influence the apparent costs of farm inputs can have a major impact on environmental management. Some farm inputs are priced or treated favourably by

[22] As long as such a program was subsidized, and there are compelling reasons why it should be, more land would be used to produce food and fibre commodities than would otherwise be the case. This distortion could be offset by the use of environmental incentives and the use of cross-compliance requirements. Without the latter two provisions, the distortions will be less than today's but would not incorporate any component reflecting environmental objectives. It would be as close to environmental neutrality as one could get.

the various tax systems in use so that they do not reflect their true social costs. There are other programs, particularly supplying trees for windbreaks or operating community pastures for cattle producers, which are environmentally friendly, though even these deserve to be re-examined in order to ascertain whether they could be improved. For example, community pastures in the Prairies already provide in a somewhat haphazard fashion wildlife habitat in addition to providing a service to farmers and protecting erosion-vulnerable land, but there may be opportunities through revised management practices, such as planning grazing rotations consistent with duck nesting regimes and deer grazing habits, to increase their environmental contribution. Services designed to provide farmers with assistance for the planting of windbreaks could also recommend and provide tree species which provide food for wildlife. Services which provide assistance to farmers to build and maintain stock watering holes, or to prevent stream bank erosion could also simultaneously increase the quantity and quality of wildlife habitat through the provision of advice and other incentives for the selection and planting of species.

At present, there is a strong tendency to treat such advice as an 'add-on' service, separate information being provided by wildlife agencies to supplement that provided to farmers by agricultural organizations. There seems to be no valid reason for such a public separation of these responsibilities.

Subsidies on purchased farm inputs connected with crop production, largely on fuels and fertilizers, have generally had the effect of reinforcing trends towards larger operations, bare field fallowing, greater use of farm machinery; all of which have increased the likelihood of soil degradation. It also appears that these trends combined with the effects of other policies have encouraged the bringing into cultivation of sloughs in fields, thus reducing duck nesting and feeding habitat - identified as a major cause for the decline in the waterfowl population of central and western North America[30]. It may also have encouraged the elimination of field boundaries, another significant wildlife habitat area as well as a buffer to the movement of soil particles carrying chemical and animal contaminants into streams and rivers.

Canadian farmers have financially benefited from fuel costs approximately one half of those in most other sectors, and although the Federal Farm Fuel Tax Rebate, the major program, is terminating at the end of 1989, its effects will continue to be felt for some time to come. Some provincial subsidies still remain, for example, Albertan farmers will still benefit from provincial subsidies on farm fuels and fertilizers.

The subsidization of costs for land improvement - costs for clearing, draining, fencing, *etc.* - all constitute a subsidy encouraging the reduction of wildlife habitat, clearing of sloughs and wetlands, increasing the area in farming and the use of water. In most cases, there seems very little economic justification for these programs now, though they undoubtedly facilitated the introduction and maturation of the agricultural sector in most regions of Canada. Where drainage contributes positively to the management of soils and water, support can continue to be provided under soil and water management programs. Assessment of the impact of irrigation and stock watering systems is not so straightforward, even though they can have detrimen-

[30]See, for example, Minister of Environment, North American Waterfowl Management Plan: A Strategy for Cooperation, Ottawa, 1986.

tal impacts on water quality and on water supplies, for they can also provide improved habitat, improve the visual appearance of landscapes, and provide for soil erosion control through increasing water supplies.

Subsidies are used by other interest groups, for example, bureaucracies for wildlife and the management of natural resources, for farmers to provide land uses they desire. This appears to create an unorganized and potentially wasteful, overlapping and competing subsidies for both environmental and agricultural commodities Also, this situation is not adequate because:

a. Farming decisions continue to be made lacking information of the implications of production choices to wildlife and the environment;

b. There is little or no coordination, except for large projects, for example, irrigation projects, between government departments through which potential land use conflicts, including unchallenged but competing subsidies for alternate uses, should be addressed and resolved rather than in the offices and fields of individual farmers.

Land prices may also be a determining economic factors in the quality of environmental management practiced on farms. Land prices have been inflated by policies that allow land to be sold free of capital gains yet allow mortgage payments to be treated as a valid, tax deductible cost . High land prices and the favourable tax treatment of farmers' land sales have meant that:

a. The share of farm costs related to land purchases has been relatively high.

b. Farmers have been encouraged by their tax regime to maximize the area that they farm.

In addition, until recently, the inflation in farm land prices, either as a consequence of farmers' demands or of land speculation around cities, has encouraged an active ownership of land by non-farmers, and a subsequent leasing of land to farmers so as to collect certain investment tax advantages for the land owner, for example, lower municipal taxes.

These trends have undoubtedly contributed to the destruction of wildlife habitat, and, some claim, to lower qualities of farm land management than would otherwise have been the case. They have also tended to make alternative land uses to cropping less attractive, and made the realization of wildlife habitat objectives more difficult and expensive.

Politically it would seem impossible to remove the advantageous tax treatment of farmland, the farmers' RRSP, and this may be an area where some offsetting tax incentives or an annuity program for land use restrictions may be more appropriate.

Programming suggestions to address these concerns about inputs, and the probable incompatibility of input subsidies with trade policies and economic efficiency, are:

1. *Put farm inputs on a non-subsidized basis. An adjustment program could be designed and delivered through the proposed farm income support program (a continuously reducing subsidy over a number of years).*

2. *Consider a program to encourage substitution of chemical inputs - particularly pesticides - with organic or environmentally friendly products. Such a program would need to*

include a research and adoption component along the lines discussed later in this review of agricultural programs.

3. *Implement a policy framework to support multiple land use on Canadian farms, as outlined in the last conclusion of the previous section. This could include the design and implementation of programs that make public contributions towards the cost of inputs on farms commensurate with the returns the public will receive from improvements to the management and use of the environment, and ones that would re-orientate the tax system, including municipal components, towards the same objectives.*

4. *Design a program to provide more land owners with income opportunities for converting farmland to wildlife habitats and conservation easements than at present.*

Market Policies and Programs

Market protection programs as currently practiced are insensitive to environment and habitat, and they all have the potential to encourage environmentally unfriendly types of production practice as long as eligibility is made a function of acreages used in production or the types of commodities produced. Thus CWB delivery quotas are based on sown and summerfallowed acreages for designated grains and oilseeds, and encourage the clearing of land for these crops so that farmers can maximize grain delivery entitlements. Other programs, notably, under the Western Grain Transportation Act (WGTA)[31], subsidize transport costs of selected exports so that the production of alternative commodities is discouraged. Others, notably the Feed Freight Assistance Program[32], subsidizes the import of product such that its local production can be discouraged. This may prevent the production of environmentally unfriendly crops or discourage the production of friendly ones.

The case of Western Grain Transportation Policy deserves special attention as it is undergoing another review, and is one of the more obvious Canadian agricultural subsidies for resolution at GATT and through CUSTA. Putting aside the issue of subsidy for the present, the other main issue is the method of payment. The payment continues to be paid directly to the Railways to replace the old Crow Rate Subsidy. It is paid for transporting designated grains and oilseeds from the Prairie Region with a net result that prices farmers receive in that Region for grains and oilseeds are increased relative to livestock even those fed on the same crops by some $10 to $20 per acre of grains depending on yields. It is alleged that this has resulted in less land being put down to forages and permanent cover than would otherwise be the case. It is also implied that this distortion would be removed if the payments were made to producers.

The planned review of this policy should review the Program's environmental impacts, and the possibility of recommending future payments to farmers using cross-compliance requirements to convert it from a subsidy into a payment for improved environmental management. See the sections on new program proposals.

It may seem obvious that one should be recommending the abolition of many forms of market protection and programs subsidizing the costs of market access, and to allow market forces

[31] Expenditures on this Federal program vary with grain sales - in the 1980's they peaked at $0.9 billion in 1987/8.

[32] Another Federal program but a small one - less than $20 million annually during the 1980's - that subsidizes the transport of feed grains to the Atlantic Region.

under a broadened farm income support program to determine long run patterns of production. However, this may only be justifiable when combined with the imposition of access barriers to products produced under environmentally unfriendly circumstances. There is obviously a place for market protection in order to discourage competitors from raping their environment, as well as for the protection of farmers and the consuming public from undue health risks in plants, animals and humans. On the other hand, under GATT and CUSTA, programs which result in increased production and/or lower prices in foreign markets, or restrict access to export markets are countervailable. Given the high degree of border protection provided to Canadian producers for such products as dairy and poultry, and the direct production incentive in such programs as WGTA, this will continue to be a high profile policy area for years to come. From an environmental perspective, previous conclusions respecting farm income support programs can apply production incentives and border protections. It would be advisable to remove their commodity basis by replacing them with a comprehensive decoupled income support program combined with the removal of areal constraints to deliveries to market. As supply managed commodities, unlike grains and oilseeds, are not responsible for habitat supply deficiencies nor, with the except of disposing of animal wastes, other significant environmental problems, no specific recommendations need be made for these policies.

Research and Information Dissemination Programs

Although public agencies generally demonstrate claims to have increased resources related to research and extension in sustainable issues, such as soil and water management and organic farming, it should also be noted that:

a. Much of this work is of controlled experiments, and not focussed on whole farms, and reflects the commodity bias in agricultural policy,

> A recent review of the quota policy conducted for the Canadian Wheat Board did recommend that the quota system be replaced by one based on inventory or supply commitments by the farmer[33]. The issue of quota policy is quite complex, it would influence production decisions, farmers favouring the breaking of land so as to maximize their eligibility to make deliveries, when supplies of grain exceed demand, but not otherwise[34]. At present there is no difficulty in selling or moving supplies of grains and quota remains an issue to the extent that farmers believe an over-supplied market may arise within their planning horizon. It would, however, be easier to change the system now than when such a situation did arise. Any further additions to the existing regulations governing quotas, as has been recommended[35], would seem only to accomplish the same ends with a much more complex, difficult to understand system than the one proposed by the Quota Review Committee.

b. Resource constraints and the belief that work in this area should be conducted by specialists, has meant that such work has become geographically more centralized while the need is to promote a more geographically dispersed sensitization of farming practices to the environment,

[33] See the Report of the 1987-88 Quota Review Committee to the Producer Advisory Committee of the Canadian Wheat Board, 1989.

[34] Even then, providing the farmer was being absolutely rational, only when the yield on the broken land was equal or less than the yield on his quota acres. However, once land is broken and included in quota, this alone may be sufficient to reduce a farmer's willingness to convert land to other uses, whatever the yield.

[35] See H.Esquirol, The Wheat Board Quota, paper presented at the Sixth Annual Western Provinces Conference on the Rationalization of Soil and Water Management, Winnipeg, November 28-30, 1988.

c. Little work has apparently been done either by agriculturalists or wildlife experts into the operations of wildlife habitats in real farming situations, for example, into the potential benefits of using predators to control pests.

d. Private sector initiatives in research and development have had to operate to reflect the financial constraints of current farming operations, where the policy and program environment has provided only limited opportunities for financially rewarding, environmentally friendly, farm operations.

Expanding on the last point, it is important to recognize that research expenditures are highly influenced by the expected impact of the expected findings. Policies which promote certain commodities only serve to reinforce research into those commodities along lines consistent with the directions of the policies. There is an obvious need for public research at least to be oriented according to long term policy priorities not current commodity issues, perhaps leading later planned price adjustments that will make the on-farm adoption of the results of a line of research more promising. In this regard, the environmental and wildlife sectors, as well as the farm machinery and chemical companies and their organizations, should consider funding more agricultural research not only into the dynamics of wildlife habitat on farms but also into low input agriculture and into agricultural disease and pest control measures less heavily dependent upon chemicals. This would be particularly effective if governments consider an approach towards agricultural inputs somewhat similar to that they have successfully adopted to limit gas consumption and emissions from cars. In this case, prior notice of regulatory positions immediately created a new research priority for both public and private organizations and a new commercial market for more energy-efficient cars, needs which were quickly and effectively met. This would create a market for not only the development of new technologies, but for farm planning or advisory services to facilitate on-farm adjustment.

Support for On-farm Innovation

There are a large number of programs providing support for the evaluation or testing of theoretically environmentally friendly production and land use practices in real farm situations. The scale of effort should be assessed. There is probably need for more, but the lack of supportive and coordinated programming in the other farm support programs should also be evaluated as this may mean that the full payoff from current or increased levels of effort cannot be realized.

The previous section reviewed briefly the concept of government's promoting reductions in farm chemical inputs through a system of notice of impending regulation, combined with increased public and private efforts to avoid any consequent financial impacts on farm operations through research, development and on-farm planning.

Synergistic Effects

Reference is made to Fig. 3, on the next page, where some of the potentially more significant impacts of the policies and policy omissions on wildlife habitat and other environmental considerations both on and off the farm are enumerated. It must be stressed that the diagram is illustrative rather than comprehensive, and a more realistic version would probably change from region to region. No claim is made that all the links between one environmental problem

	FARM INCOME SUPPORT PROGRAMS			FARM INPUT PROGRAMS						MARKETING PROGRAMS			RESEARCH PROGRAMS			
	Selectivity of Commodities	Public Subsidy of Costs	Farm Income Stabilization	Energy & Chemical Subsidies	Water Subsidies	Land Improvement Subsidies	Competing Sectoral Subsidies	Lack of Multisector Pricing of Natural Resources, including taxes	Lack of Information on Environmental Impact of Farm Practices	Market Barriers	Market quotas	Transport Subsidies	Lack of Whole Farm Focus in Research Coordination	Lack of Research into Multiple Use of Farmland	Centralization of Research	Low Priority Assigned to Research into Low Input Farming
Loss of Habitat - quantity & quality	√	√	√	√	?	√	?	√	√		√	?	?	√	?	?
Loss of Wetlands - quantity & quality	√	?	?	?	?	√	?	√	√		√	?	?	√		
Discouragement of Diversified Land Uses	√	?	?	√	√	√	√	√	√	√	√	√	?	√		√
Discouragement of Low Input Agriculture		√	√	√	√				√							√
Excessive runoff									√							√
High levels of Water Consumption					?			√	√							
Loss of Organic Matter				?					√							√
Ground Water Contamination from Cropland	?			?				√	√							√
Reduced Crop Yields & Farm Income								?	√				?	?	?	?
Encouragement of Monoculture	√	√	√	?	?	?	√	√	√	√	√	√	?	√	?	√

√ - policy is thought to have a direct negative impact

? - policy effect is more problematic or conjectural because effect will vary with other factors, or effect is not well-established

Arrowheads point to environmental problems which are influenced directly by other environmental problems, thus possibly magnifying the total effects of policies.

Fig. 3 Effects of Agricultural Policies on Natural Resource Problems

and another have been captured in the diagram, but sufficient are shown to demonstrate how the effects of one policy, which may only be felt originally on one or two environmental factors, produce change throughout the ecosystem. Similarly, it shows how it would be difficult to isolate the effects of one policy or program from the rest.

The diagram is unrealistic also because it neglects to show any relationships between the environmental factors and agricultural policy. The links presumably would mainly serve to increase the likelihood of habitat loss and environmental degradation as change proceeded to work through the system. For example, increased waterlogging or waterholding capacities of agricultural soils caused, for example, by loss of organic matter, or by the greater use of monoculture, would increase not only the likelihood of floods, but the risk of crop stress from lack of water at other times. These problems would reduce yields and farm incomes, leading to increased pressures for more subsidization of incomes, and, perhaps, for land and water improvements.

Satisfying these demands in turn may encourage more soil degradation and loss of habitat by encouraging more land clearance and land improvements for agricultural production, and greater crop specialization. These would lead to further degradation, and the cycle would continue.

It seems that the system is structured such that, without some positive manipulation of the policy factors, and in the absence of other changes, the supply and, more certainly, the quality of habitat will continue to decline unless farming becomes regionally insignificant. Even then, so much harm may have been inflicted on the environment that many of the necessary physical and biological structures necessary to support a naturally mature ecosystem will have disappeared, possibly for much longer than it took to remove them.

Ways of reversing these trends have already been identified in this chapter, they will be further refined and evaluated in later chapters.

The Bottom Line

We have made many assertions that existing farm policies discourage environmental protection and encourage the destruction of wildlife habitat. The combined income effects of Canadian farm policies not only vary by type of farm and by province but by of soils used and the quality of management, including capital investments and the technologies used. However, it is clear that a massive input of public funds must have an unintended effect on land use. The size of this effect has probably led to inflated land values and the need for inflated incentives for environmental and wildlife objectives.

To conclude this chapter the box on the next page gives an indication of the size of the distortions involved in recent years. The figures appear to be based on provincial 'averages' for cultivated acres not including summerfallow, and may overstate the public subsidy of both Crop Insurance and WGSA (as program payouts rather than premium subsidies are used), and may consequently overstate the financial inducements to crop farmland somewhat. They are also peculiar to Saskatchewan, the other Prairies Provinces having somewhat different profiles of program expenditures.

Notwithstanding these caveats, the calculations do indicate the importance of government payments to grain producers. If the same level of

payments applied in Alberta, or farmer's production costs were similar in both provinces, they would be equivalent to two thirds to forty percent of the annual cash expenditures (see Chapter 4).

It should also be noted that only about a third of the value of the payments is based on the current trade war in grains (actually $16), the remainder reflecting the impact of regularly occurring natural 'disasters' , another third, and the remainder WGTA and input subsidies. Thus increases in grain prices would not remove a substantial amount of the recent payments, though inflation will reduce the importance of WGTA in the future unless the payment is increased. Changes in yield would have an impact on the total support offered such that it would decline in the more agriculturally marginal areas.

The impact of these expenditures on farm production can best be illustrated with respect to the continuing discussions on the WGTA. The Governments of Alberta and Manitoba, as well as many farm groups, consistently make the point that Prairie agriculture would be more diversified if the so-called 'Crow benefit' was paid to the producer rather than the railways. One of the most recent reports estimates that hog and beef production could expand in Manitoba by 28% and 25%, respectively, if this was adopted[36].

Annual payments based on recent five years of grain production in Saskatchewan (the years are unspecified)[37]:

1. **Crop insurance - $12 per acre**
2. **Drought Assistance - $2 per acre**
3. **Special Canadian Grains Program - $12 per acre**
4. **WGTA - $11 per acre**
5. **WGSA - $2.50 per acre**
6. **Canadian Wheat Board Deficit - $2.50 per acre**
7. **Fuel rebates, etc. - $1 per acre**

Total: $43 per acre

[36]Deloitte, Haskins and Sells, Impact of a Change in the Method of Payment: a Discussion Paper for the Agricultural Advisory Council of Manitoba, 1980.

[37]From H.Esquirol, The Wheat Board Quota, paper presented at the Sixth Annual Western Provinces Conference on the Rationalization of Soil and Water Management, Winnipeg, November 28-30, 1968, page 19.

Chapter 4
Current incentives for agriculture to habitat farmland conversions in the Prairies

It would appear that conversions from farmland to habitat are limited more by governments' willingness to allocate funds for habitat conversion programs than by farmers' willingness to participate in such schemes. The incentives currently in use for over-subscribed programs are less than the government payments that would be incurred if the land in question remained in crops.

Three examples are discussed:

1. Alberta's Landowner Habitat Program provides for annual payments of 80% of the going rent for the same types of agricultural land for conversions into habitat. Agreements are drawn up, incentives being discounted for rates less than 20 years, costs repayable on default. Annual payments range from the high teens per acre for cropland down to less than $5 for non-agricultural land. For comparison to the PFRA program, this would be the equivalents of the one-time payments shown in the following table.

Annual Payment /acre	Discount Rate 5%	7.5%	10%	12.5%
$7	$87	$71	$60	$51
$10	$124	$102	$85	$72
$12.50	$150	$122	$102	$87
$15	$187	$153	$128	$109

Table 1: One Time Payment Equivalents of Annual Incentive Payments

Note that this program is based upon the local costs of farmland rent for equivalent quality land for agricultural purposes, ownership is retained by the farmer, the impact on the selling price of the land when it is in habitat is not known. The rents paid for agricultural land reflect the agricultural income expected from the land over a future time period. They consequently, reflect the levels of governments' as well as market payments that are expected. The greater the payments for agriculture then theoretically the greater the rents and the greater the incentives that need to be paid.

However, as long as the incentives paid are equal or less than the government payments that can be expected on the land if it was to remain in agriculture, then society, except for any additional burdens related to the costs of program delivery, would come out financially ahead with no budget constraints on the program for conversion until existing agricultural markets could not be served as efficiently as previously. As this is unlikely to occur for some time as the supply of most farm commodities is highly concentrated in relatively few of its producers, for example, 20% of producers accounted for 52% of deliveries to the Canadian Wheat Board in 1987/8 it is safe to conclude that participation in habitat programs could be increased considerably before any appreciable and economically significant reduction in agricultural production capacity would occur.

Similar habitat programs exist in most provinces, they tend to be operated by provincial wildlife as opposed to agricultural agencies, and the savings in government payments for agricultural payments that occur on the Prairies at least accrue more to the Federal than Provincial Government.

2. The Permanent Cover Programs of P.F.R.A.'s component of the Federal - Provincial Soil and Water Agreements for the three Prairie provinces are similar, relatively small, fully subscribed programs. Under them for the first time during the last year, land owners were able to bid for a one time payment for converting cropland to permanent cover. Supplementary incentives are available from other agencies for habitat provision. Preliminary analysis of the bids has revealed a high level of participation with bids for a twenty year commitment to permanent cover of the order of $40 plus another $20 or so for seeding costs. In order to make comparisons with Alberta's Landowner Habitat Program, this is the equivalent of annual series of per acre payments of $3 for a 5% discount rate to $6 for a 12.5% discount rate.

   These low figures are only preliminary results, and may be adjusted as P.F.R.A. completes an assessment of the program. The low incentives required to elicit responses probably reflect the extreme marginal nature of the land involved, and one would expect bids to increase as the program matures.

3. Expenditures for agricultural purposes on a per land area basis are not easily obtained. To begin with, some program expenditures do not result in cash payments to farmers or to payments that can logically and meaningfully allocated to farms or portions of them, for example, research expenditures. Second, farm cost of production data bases are not in a very advanced state of development, and even the Census of Agriculture presents problems. In order to provide some common frame of reference with the above two examples, a simple analysis was undertaken of Albertan grain farms used to establish cost of production information for that Province. The farmers participation in this work indicates that these farmers are not probably typical, though how much they differ from the norm and in what respects is not known[38]. Norms, anyhow , are not of great significance to this study, whose major conclusion relates to the potentially substantive habitat gain from converting quite large amount of farmland used for agricultural production with only a marginal impact on agriculture.

Table 2 on the next page gives some of the farm income statistics showing not only the surprisingly high level of government payments made to farmers on per acre basis[39], and the relatively high proportion of net returns accounted for by these payments. Since these returns provide returns to the operator's labour as well as his inputs, it is easy to see how some farmers can be enticed by payments of the order of the equivalent $5 to $15 per acre to convert cropland to per–

[38]Probably they are an above average group according to management inputs and perhaps farm incomes as participation in the survey is voluntary.

[39]In this case, as well as in the cases of Figs. 1 and 2, the effects of indirect government expenditures that cause farmers to receive higher product prices or pay lower costs for inputs are not included in the government payments. Depending on yields these payments would amount to another $10 to $20 per acre.

Year	Farm size	Farm performance	Receipts from government programs per cultivated acre	Net cash income per cultivated acre	Government receipts as percent of net cash income	Net cash income per acre less government payments and crop insurance payouts
1986	Largest 25%	High	$9.78	$40.16	24%	$30.37
1987			$24.04	$54.17	44%	$28.08
1988			$21.20	$105.78	20%	$80.15
1986		Low	$13.21	$12.09	109%	-$5.07
1987			$19.85	$12.99	153%	-$13.48
1988			$16.44	$71.78	23%	$51.30
1986	Medium 50%	High	$19.37	$51.05	38%	$28.25
1987			$29.67	$63.67	47%	$28.88
1988			$25.73	$120.29	21%	$92.09
1986		Low	$14.18	$5.33	266%	-$14.36
1987			$25.65	$25.77	100%	$0.12
1988			$23.75	$78.03	30%	$51.81
1986	Smallest 25%	High	$14.63	$85.47	17%	$69.41
1987			$42.41	$85.16	50%	$36.19
1988			$39.20	$139.67	28%	$97.65
1986		Low	$15.64	$19.85	79%	-$2.67
1987			$25.62	$22.65	113%	-$4.10
1988			$19.83	$58.46	34%	$36.58

Definitions:

1. Small farms - average size about 500 acres, 25% of the sample population (170 to 200 each year)
2. Medium farms - average size about 1200 acres
3. Large farms - average size about 2300 acres
4. High performance farms - the 50% of farms with the lowest ratio of expenses to revenue.
5. Low performance farms - the other 50%
6. Receipts from governments include all cash payments made directly to farmers excepting for payouts under the Alberta Crop Insurance Program. This means that payments to third parties or tax incentives are not included in government payments. For example, payments under the Western Grain Transportation Act are not included under government receipts even though they did result in increases in receipts for the farmers surveyed.

Source: Data supplied by the Crop Analysis Division, Policy Branch, Agriculture Canada.

Table 2: Sources of net farm incomes for a sample of Albertan grain and oilseed producers, 1986 to 1988

manent cover or to habitat. As these figures are averages determined on a whole farm basis, one can be sure that there will be significant areas of cropland providing returns well below these figures. These areas would be prime areas for habitat and may also indicate areas requiring soil rehabilitation, or high rates of chemical runoff as crop growth rates would be low and inputs would, probably, be the same as elsewhere. On the other hand, the table also demonstrates, even in these economically difficult times, there are many other farms where the cost of habitat incentives would have to be much higher. However, putting all these numbers in some perspective - if annual payments of $15 per acre would be sufficient to entice conversion from cropland into habitat for 15 years, then the North American Waterfowl Management Plan could pay for up to some 4.5 million acres, or over 15% of cropland (the Plan's objectives are for 3 million acres of duck habitat).

Furthermore, if the governments' payments to farmers were not dependent upon cropped acreages and farm income support was on a decoupled basis, incentive payments to farmers would have to be sufficient to offset net cash income less receipts from government including crop insurance payouts, on a per acre basis. Again the indications are that within farms there are likely to be areas where habitat incentives within the bounds already discussed would provide a better return to a farmer's investment in his property than the production of crops, unless commodity prices increase significantly.

Conclusions

1. There is evidence that habitat land can be obtained from existing crop and cleared land at relatively low cost (and within the financial bounds of the North American Waterfowl Management Plan).

2. Government payments account for a considerable portion of new returns from cropland on the Prairies and this distortion, while not necessarily distorting the relative income generating capacity of different types of land and different types of farm businesses, they contribute considerably to making crop production a profitable operation.

3. The outlook for improvements in commodity prices so that these conclusions do not apply are not particularly good, not only because of the outlook for international commodity markets, but also because of the relentless growth in input costs in line with rates of inflation.

4. More information on the variability of returns per acre should be a priority of both senior levels of government, as should the increasing of farmer's awareness of the potential for variability within each farm, and of alternative, economic opportunities for the land than crop production. Net returns are also highly variable from year to year - payments for habitat would not and may provide a stabilizing element of future farm incomes.

5. Farms generating a high income on a per acre basis seem to do so on the basis of generating high crop revenues (yields) combined with low inputs. This indicates:

   i. The social desirability of focussing agricultural production on the most potentially productive lands,

   ii. The relatively low environmental impact such farms can have,

iii. **Wildlife habitat may be a particularly attractive option for the low income farm operator.**

Chapter 5
The implications of forecasts for farm incomes and international trading arrangements

The Implications of Farm Income Forecasts

Recent forecasts of future levels of farm income in Canada[40] have a number of important implications for the environment:

1. The lack of positive commodity demand and price outlooks in relation to projections of the costs of purchased inputs means that financial pressures on farmers will continue. Land prices, which have already declined in real as well as absolute terms, are unlikely to regain their 1970's levels except in nominal terms for some time, unless commodity markets improve considerably in relation to potential supply. This may lead to the following:

   a. Pressures to maintain or increase inputs so as to maximize farm production in order to cover the costs of land will decline, although significant short term pressures related to the high cost of credit will continue. Land retirement, low input agriculture, the increased use of crop rotations, *etc.* may well become distinguishing features of agriculture in the 1990's, particularly when the additional impetuses of social and market pressures related to health and environmental concerns are taken into account. *Government programming could be designed to ease or facilitate adjustment to these trends and to reduce the lag effects that can cause mixed signals to operate at any one time in the economy.*

> In an as yet draft review of the 1985 Farm Bill, the U.S. Department of Agriculture has estimated that only 50% of the land in crops in the United States will be required to meet domestic and market requirements by 2030. The forecast is, of course, dependent on predictions for markets, yields and the performance of competitors, but under all scenarios less rather than more cropland would be required by then. One would expect that the same forecast conditions would affect Canada.

   b. As a result of the forecast, continuing cost-price squeeze, **the opportunity costs of providing environmental goods and services on Canadian farms will fall at the same time as the demand for them will be increasing, and farmers will be seeking additional income sources as a result of the growing realization that previously optimistic commodity market forecasts will not be realized.** Programming in support of environmental objectives will become easier. Some indications of how small incentives can be to realize conversions out of cropland and into habitat in the Prairies were given in Chapter 4.

[40] Most of the information on which the expectations for farm income used in this report are based comes from Agriculture Canada, Medium Term Outlook, July 1989, Ottawa. Similar conclusions with respect to commodity outlooks and the implications for U.S. agriculture and its interface with the environment have recently been made by Pierre Crosson - see his article 'Supplying the Environmental Values of Agriculture', Resources No. 98, Winter 1990, Resources for the Future, Washington, D.C.

c. Existing farm income support programs will have to undergo major revisions. Some will run out of funds and will not be able to make payments, and payments themselves will be reduced by the averaging effect of a run of 'bad years.'

2. Production will shift, irrespective of environmental considerations, in favour of livestock and livestock feeds, towards more permanent and less annual crops, providing Canadian producers are assured unrestricted access to U.S. markets (as CUSTA provides). Permanent crops can be managed to provide wildlife habitat, and they will result in less environmental degradation because of lower inputs and increased plant cover. Adjustments to farm support policies could reinforce this trend. Some areas, for example, the Regina Plains, are likely to remain heavily into grains as there are no realistic, alternative crops, but in many . as a greater range of crops, particularly at the farm level will be supported. The economic outlook for livestock and livestock products is quite 'bullish', particularly on the Prairies[41]. Discontinuance of the current policy of the Western Grain Transportation Act of paying the railways could reinforce this trend towards greater use of livestock on Prairies farms, particularly in Alberta. This would provide improved opportunities for habitat protection and expansion as well as leading to some erosion-prone soils being given permanent vegetative protection.

3. Biological engineering techniques, particularly from genetic engineering, will increase the profitability of livestock operations more than crops. This may provide further opportunities for the expansion of livestock production in Canada. Any growth in output will, however, be limited by rather stable levels of demand for meat, unless considerable export markets are developed, and by improved feed conversion levels. Plant engineering will begin to provide new technologies to the farmer, particularly so that lower fertilizer inputs are necessary, sensitivities to drought are reduced, and plants provide improved soil protection. However, the same degree of technological changes are not expected for the crop than the livestock sector[42].

4. Canada's position in most commodity markets will not substantially change - it will remain a price taker whose production has little if any impact on major demand/supply relationships.

5. Pressures to target farm support programs more effectively in order to reduce costs and to provide a more equitable level of support, as well as continued, high level trade negotiations, will probably lead to a significant reorientation of Canadian farm support programs to address the specific income needs of individual farmers with less of a commodity focus than at present. This will provide an opportunity to incorporate environmental factors in programs, or to design support programs that are more supportive of environmental objectives than the set currently in use.

6. Technological changes, rationalization of public support for the sector and market conditions will combine to reduce the area devoted to agriculture.

[41]Statistics Canada's survey of investment intentions currently identifies this sector as one of the most expansive in terms of investment plans in the economy.

[42]See U.S. Office of Technology Assessment, Congress of the United States, Technology, Public Policy and the Changing Structure of American Agriculture, Washington, D.C., 1986.

These considerations along with the environmental concerns previously reviewed are all particularly supportive of the types of adjustments to farm support policies necessary to remove the constraints to improved environmental management that have been discussed.

They are also consistent with the position of the Federal Minister of Agriculture who, in a recent policy paper [43] outlined four pillars for the future of the agricultural sector:

- *more market responsiveness,*
- *greater self-reliance in the agri-food sector,*
- *a national policy which recognizes regional diversity, and*
- *increased environmental sustainability.*

Based on the reasonable assumption that a building would need all its pillars working together and not separately, the possible directions that farm support programs could take which have been identified in this report are consistent with all four pillars, though obviously their prime rational fits most closely with the last. The factors militating against the changes which have been suggested are not market requirements for agricultural products, nor their potential supply, nor the well-being of farmers, nor general apathy about environmental issues, but the following concerns that will be addressed in the next chapter on programming proposals:

1. Lack of alternative means of generating alternative or supplementary income from agricultural lands,

2. Existing farm support programs, particularly those designed to support farm incomes and to provide marketing and transportation assistance, that encourage expansion of cropland and high intensity of input farming,

3. Lack of a reliable, for example, statutory, base to environmental programs in contrast to those covered in point # 2 immediately above. Farmers appear to make decisions under the assumption, realistic or not, that the state will continue to provide them with income protection. They do not have the same attitude towards the commitment of their governments to other causes, such as environmental protection.

The combined effect of these policies is that many environmentally unfriendly trends have and are being encouraged by existing programs and by the non-existence of environmentally-based programming that immediately impact on farm incomes - a doubling of the discrimination. Sooner or later such policy mixes will become unacceptable not only to taxpayers and farmers, but to international trading partners.

International Trading Pressures

How subsidies are to be defined and addressed under CUSTA is still not clear, though the intent by both sides is to minimize trade distorting subsidies. Probably actions by the U.S. against Canadian farm subsidies will continue to be a result of lobbying by U.S. agricultural commodity groups. They in turn will be reacting to oversupply situations in their markets. Consequently, it is likely that most pressures on Canada will be related to supply managed commodities, and to livestock products where there is a North American-wide market, for example, hogs and beef. It is not clear whether CUSTA would be used for grain subsidies, as these products are sold on world markets, where the battles are fought at GATT. Oilseeds may

[43] Agriculture Canada, Growing Together A Vision for Canada's Agri-Food Industry, Ottawa, 1989

be different if Canadian canola makes substantial inroads into U.S. oil markets, and then Western Grain Transportation Policy could be targeted. However, revision to the method of payment under the WGTA so that the so-called 'Crow benefit' is paid to farm producers rather than to the railways, could be viewed in the U.S. as a new Canadian subsidy for livestock production at the same time as it would promote increased diversification and value-added in Western agriculture. Neither method of payment, unless it is changed to a one or limited time payment, then in the long run meet the twin objectives of furthering the development of agriculture and improving the management of natural resources.

It is still not clear whether GATT will be able to resolve international trading issues, nor what the response of the U.S. will be if it is not . The U.S. Secretary for Agriculture would prefer not to show his hand with a new Farm Bill until the situation is clearer. Recent posturing by senior U.S. officials have indicated that the current trade war would be continued if resolution was not achieved. Canadian producers would then face a continuance of low international grain prices, precipitating demands for more income support programs of an *ad hoc* nature as well as to replace the now bankrupt Western Grain Stabilization Fund.

Supply management and Western Grain Transportation Policies are the most vulnerable Canadian subsidies at GATT, and even if GATT does not meet its objectives, they will continue to be questioned internationally. GATT has already accepted the concept that incentives can be paid to farmers to provide environmental services without distorting the international trading environment in the case of Austria and Switzerland. It is likely that incentive payments to farmers for protecting the environment would be acceptable to GATT, particularly if they contained no direct links to specific commodities.

A restructuring of policies and a restructuring of some government expenditures on farm subsidies towards environmental objectives then would have the advantages of:

1. Being compatible with GATT objectives, whatever the outcome of the current round of negotiations,

2. Providing an improved return for public expenditures on agriculture,

3. Being consistent with the steps now being taken in the U.S. to strengthen the importance of environmental management on farms through the new Farm Bill,

4. Increasing the availability of production and income alternatives for farmers, thus making it easier for them to respond to changes in future market conditions.

Trade negotiations may require adjustments to a number of Canadian agricultural programs. Possible program adjustments, along with some of the potential environmental gains that could be achieved are briefly enumerated below:

1. *Western Grain Transportation could be viewed as an unacceptable subsidy whether it is paid to the railways, as presently, or to farmers. Conversion of these payments into a program providing on-farm incentives for environmental management, as well as providing a decoupled income stabilization, is an attractive option reviewed in the next section.*

2. *Supply management regimes could be required to demonstrate more market as opposed to production price sensitivity than at present. Although, with the exception of dairy, supply managed commodities do not require a large land base, incentives to improve the handling of animal wastes may be a way of providing at least some financial support during the transition to a new policy regime. However, such a program may require 'new funds' unlike Western Grain Transportation where some or all of existing and statutory expenditures could be diverted to a new use.*

3. *There may be tactical advantages to be gained from taking a less reactive position to external pressures regarding farm policies, and moving unilaterally to make Canadian programs more market and environment responsive. This would entail a broader restructuring of policies and programs, making payments conditional on the implementation of desirable practices, promoting supplementary and alternative uses for farmland, generally reducing subsidies and encouraging movement out of commodities undesirable from either a market supply or environmental point of view. Advantages of this broader approach include:*

   a. *Consistency with a trade policy position that supports no unwarranted subsidization of farm production or export prices;*

   b. *Consistency with Canadian commitments to adopt sustainable development policies, for example, to the O.E.C.D. with respect to agriculture;*

   c. *Consistency with Canadian positions on other, international environmental and natural resource concerns, for example, commitments under the North American Waterfowl Management Plan, on acid rain, global warming, North Atlantic and Pacific fish stocks;*

   d. *Gains in the efficiency and effectiveness of public expenditures in support of agriculture and the environment.*

Chapter 6
Recommendations

These are discussed under a series of headings:

1. Wildlife habitat requirements,

2. Other environmental objectives,

3. Agricultural policy adjustments,

4. Delivery systems.

Habitat Requirements

Although wildlife interest groups have articulated some clear population goals for birds and mammals, primarily waterfowl, the implications for habitat have been made much less clear. Even less clear, then, are the habitat objectives they wish to achieve on farms. This lack of precise landscape objectives for wildlife habitat can only hinder the integration of planning for both wildlife and agriculture.

A landscape approach would allow for the ecological management of rural lands on a systems basis, a prime requirement for maximizing the sustainability of any chosen path of development. It would avoid reducing wildlife management to the overly simplistic task of providing for the immediate needs of one species, which seems only a small step from a zoo-type of environment.

It would also enable land users to appreciate the complex of interactions that can be managed and capitalized on for the benefit of both agriculture and wildlife. On the one hand the wildlife community provides 'services' for the agriculturalist, ranging from controlling insect pests to the provision of soil erosion and water management controls through windbreaks and other forms of buffer zones. On the other hand, the farmer can provide an environment where highly valued species can thrive.

Unfortunately, the theory of rural landscape planning, at least in Canada, is in its infancy even though there is growing recognition of the direct and positive relationships between agricultural practices, soil and water conservation, forest management and natural resource conservation and enhancement[44]. There has been some work published on the quantity or supply of habitat[45], but very little work of a substantive nature has addressed quality issues. The case for expanding habitat would be made much easier if this was not the case.

Some programming suggestions for addressing this need are provided later under delivery systems.

It is, however, possible to make some conclusions regarding the types of habitat programming that may be required at the interface with and on farmland. These are outlined below with some pointers regarding implications for programming. They all need to be given specific regional and local content (again see the section on delivery systems).

1. Single use areas - the management of existing farmland by wildlife agencies exclusively for wildlife purposes plus the management

[44] See, for example, S.G.Hilts, 'Stewardship of Wildlife and Natural Heritage in the Rural Landscape', in Notes on Agriculture, XXII, No. 1, 1988, University of Guelph.

[45] See, for example, Wildlife Habitat Canada, The Status of Wildlife Habitat in Canada: Problems, Issues and Opportunities, Ottawa, 1986.

of relatively extensive tracts of permanently covered land for agriculture and wildlife purposes.

- Such areas, frequently referred to as 'reserves', are a relatively expensive means of providing some of the needs for habitat. Without careful and perhaps expensive implementation they may not occur sufficiently in areas of prime cropland. They are a major component of the implementation plans of the North American Waterfowl Management Plan.

- They possibly could be used to remove extensive areas of marginal and vulnerable cropland.

- Increasing the area in reserves would be consistent in many areas with expected reduced agricultural land requirements.

- The relatively high purchase and operating costs of reserves will mean that they can at best only offer a partial solution to the habitat supply problem.

- Increasing the areas in reserves generally will require a financial incentive - this could be a one time payment or some form of annuity-like payment, and could be financed by savings from other government programs, for example, P.F.R.A.'s permanent cover programs (a preliminary evaluation of these new programs would be very useful). The payment required seems to be quite low - only some $40 to $60 per acre as a one time payment was required in the first year of the program to commit some 200 000 acres for 10 or 21 years to maintain a permanent cover. Limited farm cost of production data which are available indicates a low level of net return from crop production in many areas, and a real opportunity for increasing the supply of habitat at a relatively low cost as long as it is compatible with farmers' long run income expectations for the land (see Chapter 4). Specific habitat requirements for such a program have to be determined, as do the potential efficacy of various types of incentive payments.

- Ownership of land under such a scheme is an issue, also what becomes of land when times are good and/or vegetative cover seriously modified or destroyed. The reasons why the components of P.F.R.A.'s Permanent Cover Programs providing support for groups to assemble land have received little use during this first year of program delivery should be investigated.

- Links between the area committed to reserves and the agricultural subsidy issue are not very strong though current agricultural programs may inflate to some extent the prices that have to be paid for farmland to reserve conversions.

- Existing landowner stewardship programs delivered by many provincial and private organizations are generally designed to support an exclusively wildlife function or a combined wildlife and grazing function on existing farmland. They tend to focus on wildlife benefits to the exclusion of others, for example, environmental and farming benefits. Consequently, the programs generally are not well designed to support integrated land uses. Thus they tend to neglect their potential contribution towards improving the landscape ecology of many areas. Nor do they focus much on

the promotion of the use of field boundaries and margins around good farmland, poor land and wetlands within farms as habitat, nor on the promotion of diversification of farmland use.

2. Within farm habitats along field boundaries and around marginal cropland and wetlands within and between fields.

   - This type of habitat is consistent with the needs of a wide variety of wildlife

   - Expansion of this type of land use is consistent with expected future farmland requirements. It also offers prospects of real environmental, financial and aesthetic gain for farm populations.

   - Programs supporting the growth of boundary habitats would allow for increased farm productivity through retirement of low yielding land within fields. The area involved would increase if some incentive was available based on savings from other programs, and if the incentives to maximize the area of cropland on Canadian farms were removed.

   - There may be additional cost savings to producers and governments from removal of lower yielding, more vulnerable lands from food production. For example, input costs may decline more than cash receipts from farm commodities, and the public costs associated with soil and water degradation through farming activities would decline.

   - Some of this land should simply be removed from production because it should never have been broken in the first place. This may provide a real opportunity for Agriculture Canada and Environment Canada, with their provincial counterparts, to work towards the foundation of a Grasslands National Park.

   - There is little published experience of integration of habitat and farming - there may be potential benefits, for example, integrated pest management - and requirements for increased crop damage protection and for the types of habitat required have to be determined.

   - Expansion of on-farm boundary habitats will require that the existing commodity and geographic focus of many agriculture programs be modified.

   - Commitment to expanding the on-farm provision of habitat provides an opportunity to reorient public funds for income subsidies towards a more diversified set of farm products. It is not clear that wildlife is sufficient by itself - some alliances need to be made with the conservation community to develop a broader set of practices and uses that would be supported.

   - Ideally programming should be according to local priorities so habitat expansion activities should become an integral part of soil and water conservation agreements. It is likely that in most areas where there is the greatest need for the expansion of habitat more Federal than provincial funds will require re-allocating. A new Federal policy should be developed outlining the conditions under which these funds would be allocated to provinces or to private groups for habitat and other environmental initiatives - see the later section on

delivery systems for a discussion of the possible roles for the private sector.

3. Increased diversification of farmland use:

   - This would provide more permanent cover would reduce erosion, water runoff, and increase some forms of habitat.

   - If new crop rotations or livestock are introduced into farming systems, this may reduce the consumption and runoff of chemical inputs and consequent water pollution.

   - Having a more diverse set of crops it may stabilize farm returns less government programs because the impact of commodity specific price falls and temporary declines in yield on farm incomes would be reduced.

   - It is not clear that diversification is an economically viable alternative everywhere, for example, parts of the Prairies.

   - Many existing programs will require adjustment to avoid competing pressures to maximize land area in crops or specific commodities.

   - There is little published experience with successes and problems of diversified farms, nor on their needs for crop damage insurance.

Recommendations:

1. *Agricultural and wildlife agencies increase the level of integration in programming affecting rural land use. Planning of rural landscapes should be expanded, and become more comprehensive so that habitat priorities become clearly defined. The growth of farm advisory services providing advice on financial, production and natural resource management to farmers and other stake holders should be encouraged.*

2. *Assistance should be provided for local groups to develop and deliver voluntary programs for rural landscape enhancement, particularly involving farmland, focussing on land that is economically marginal for crop and livestock production wherever possible. This proposal will be reviewed in more detail in the section on delivery systems.*

3. *The design, adjustment and delivery of agricultural production and marketing programs, including research and extension, should become sensitized to wildlife and other natural resource considerations - see the section on agricultural policy adjustments.*

4. *Governments should address the need to adjust existing farm policies - see the later section on agricultural policy adjustments for more details.*

Other Environmental Objectives

It has been a number of years since reports demonstrating the links between agricultural policies and soil and water issues in agricultural Canada have been published, yet there has been little progress made in influencing agricultural policies. Most Federal-Provincial agreements on soil and water conservation ignore the issue, though the one for Alberta does not. They mainly focus on on-farm demonstration and technology assessment, and on monitoring. Some also include a permanent cover program

whereby incentives are paid to convert cropland to permanent cover (see Chapter 4).

Not only does the breadth and funding of these agreements need to be increased, but they need to last longer than the two or three years presently used. If policies and programs in this area are to influence most farmers, they need to be given the same temporal and legal base as other programs.

Governments have undertaken to complete environmental assessments of their policies and programs. This may encourage a less complacent attitude towards the importance of production and marketing policies to the management of natural resources. However, this is unlikely to occur as long as each policy is reviewed on a separate entity as it is the total accumulated not individual effects that underlie the problem.

It will also be important to ensure that assessments are conducted from the perspective of all the stake holders in the rural landscape, not just the farmers. If the latter approach is maintained not only will significant links between agriculture and other rural-based sectors, such as wildlife, recreation and forestry, be lost, but so will opportunities for farmers and governments to benefit economically from the multipurpose use of farmland.

Recommendations:

1. *Make all the recommendations applying to wildlife equally applicable to the conservation and management of agricultural soil and water resources.*

2. *Governments should conduct assessments of agricultural policies from the perspectives of all the stakeholders in rural landscapes not just the farmers, use this to identify opportunities for non-agricultural income earning opportunities for farmers. The assessments should be designed to uncover how the complete set of policies influence a farmer's production decisions, and not conducted on a program by program basis.*

3. *Existing and planned federal-provincial agricultural soil and water conservation agreements need to be extended in scope and time frame so as to provide the management vehicle through which the recommendations of this report concerning on-farm and local programming can be implemented. Some joint coordinating instrument may also be required to implement the more global policy reforms recommended in this report.*

Agricultural Policy Adjustments

Perhaps the most important recommendation of all that can be made in this section, is for all the stakeholders knowingly or unknowingly involved in the management and use of rural natural resources to recognize their communality of interests regarding the economic liberalization of agricultural policies in Canada. Reform of international and domestic trading regimes to maximize the impact of comparative advantage will in the long run provide most economic benefit to all the stakeholders involved in agriculture. As long as a robust system is designed to provide similarly undistorted measures of the benefits and costs of various impacts of agriculture on natural resources, there will be no further need to adjust agricultural policies to address environmental issues. On the other hand, policies that advertently or inadvertently distort market processes by subsidies that may set in motion a series of adjustments that move the sector further and further away from environmental objectives. Examples of this have al-

ready been given in the earlier chapters.

The solution set to the problem of avoiding these policy distortions quite simply are:

1. *At the provincial and national level, provide support to farmers that is decoupled from commodities, except where contributing to the costs of localized, farm support systems (see below).*

2. *The delivery of land use (including habitat) incentive programs be part of a set of decentralized farm production support initiatives, the delivery of which should be*

   i. *local,*

   ii. *designed to address the interests of all stakeholders*

   iii. *recognize and encourage the development of multi-uses for rural land.*

It is very challenging to design and implement a farm income support scheme that would avoid the distortions inherent in a commodity approach, and at the same time be directed towards regional sensitivity or development and environmental goals that most governments desire. One possible approach would be to replace national and provincial schemes with more locally orientated program design and delivery systems. However, provincial and national schemes are more likely to be more cost effective at providing income support and program administration. They would be much less effective in providing direction as to optimum production and land use practices, and in reflecting peer pressures (from the populations surrounding farms as well as from farmers themselves).

Income support proposals that focus more on the individual farmer's needs through individual farmer account systems[46] will be more environmentally friendly if they are based on farm income rather than on returns for individual commodities. For reasons of administrative costs, government contributions and the administration of such schemes have generally been designed as national systems where farmer premiums and payouts reflect not only nationally consistent rules, but the priorities and income circumstances of individual farmers. The environmental impact of these programs is likely to be positive as they would not distort the geographic productivity across and between farms. However, the more subsidization of premiums, the more land that will be included in agricultural production although the biases against livestock that exist in the income stabilization schemes of some provinces will be removed. Probably subsidization of premiums cannot be avoided, for otherwise farmer premiums would be so high as to discourage enrollment with all the pressures this would bring when farm incomes are low. This provides justification for public incentives, and for the use of cross-compliance requirements in favour of wildlife habitat, given the public investment involved.

Whatever scheme is chosen to replace the existing, environmentally unfriendly schemes, it seems important from the environmental perspective that farmer premiums and payouts do not favour any particular practices.[47]

If, for reasons of administrative efficiency and so as to accomplish the required changes quick-

[46]For example, see the income support proposals contained in Grains 2000, The Road Not Taken: An Opportunity for the Canadian Grains and Meat Industry, mimeographed, 1988.

[47]Likewise, applying cross-compliance requirements to commodity specific programs can have the effect of encouraging the production of other commodities.

ly through marginal adjustments to existing programs, it is decided that a provincial or national framework should be maintained, it seems necessary that future Canadian farm income support programs be:

1. *Decoupled from commodities so as to encourage farmers to remain in business through short lived downturns in their businesses and to manage the farm as a whole, not as a series of commodity specific enterprises (since this would encourage increased production of specific commodities, over-specialization and monocultivation).*

2. *Provide incentives for farmers to reduce farmer payouts through the adoption of risk-reducing production systems (more diversification of crops, greater sensitivities to production systems able to withstand drought, low temperatures, and other causes of low crop yields), which are more likely to complement environmental objectives than systems which maximize returns under optimum growing conditions.*

The case for decoupling of farm policies, particularly income support ones, from a trade perspective is generally made as follows:

> **In most developed countries, including Canada, the complete liberalization of world agricultural trade will lead to a general reduction in the welfare of agricultural producers ... Under these circumstances, it seems inevitable that some form of decoupling concept, combined with some form of trade-neutral, direct-income payment policy, will have to be adopted if agricultural producers are to be persuaded to accept the domestic reforms that will be associated with the liberalization of trade [48]**

[48] J.C.Gilson, World Agricultural Changes: Implications for Canada, C.D.Howe Institute, Toronto, 1989.

We have been making the case that decoupling will also provide the means whereby income support policies do not encourage the undue expansion of cropland, monoculture, agricultural inputs, particularly of chemicals, and inadvertently increase the opportunity cost of farmland against the interests of wildlife interests and the general public. It could also do this without any significant change in the amount of wealth generated from rural areas and from agriculture in particular, in fact it would probably increase it.

To be fully effective a decoupled income policy would need to be combined with policies towards the use of inputs, marketing and the financing of research that removed incentives for habitat destruction and environmental degradation. The same policies would also need to provide support for wildlife interests and other environmental objectives as discussed above. Providing a system of economic and regulatory measures were in place to reflect habitat and environmental considerations, there would not be any need to subsidize any inputs except to remove temporary restrictions on their use.

Recommendations [49]:

1. *A decoupled income support program should be developed to replace all crop insurance and income stabilization programs. The proposals of the Grains 2000 Group provide a suitable base. Funding could be provided*

[49] Most of these recommendations, particularly those related to programs having an immediate effect on farm incomes and the policies of the Canadian Wheat Board, have been reviewed with and gained the support in principle from senior representatives of the Canadian Cattlemen's Association, the Alberta and Saskatchewan Wheat Pools, Unifarm, Western Canadian Wheat Producers, and the Keystone Producers. Other groups have not yet been contacted. Amongst those contacted there were no dissensions on the recommendations.

from funds earmarked for existing programs, including Western Grain Transportation Act, the various crop insurance and Agricultural Stabilization Act programs. A relatively small proportion of these funds could also de used to support local programming - see the next section.

2. *Marketing programs should be adjusted so that eligibility or participation is based on a farmer's direct ability to supply the market, for example, grain inventory (actual or expected), not on his/her ability to purchase or rent and cultivate land. A farmer should be able to make production commitments solely on the basis of his ability to supply a product .*

3. *Farm input policies should be adjusted and expanded so as to provide positive support for habitat and environment objectives, and so as to remove unwarranted subsidies that work against these objectives.*

4. *Research and extension priorities, as well as other production and marketing policies, and priorities, should be reviewed and adjusted so as to relate to local land use priorities, and so as to provide a positive economic climate for the avoidance of certain practices that run counter to habitat and other environmental objectives. In particular, governments should develop and implement plans to encourage farming to maximize incomes through efficient production, reducing chemical inputs wherever appropriate, protection of health and environmental quality, and the enhancement of biological interactions and natural processes.*

5. *Specific and immediately implementable, additional adjustments include:*

   a. *Revising the Western Grain Transportation Act. Programs under the current Act are vulnerable to international trading pressures as a subsidy. The Current Act is unpopular in certain areas, for example, Alberta, as payments are made to the railways rather than to producers. Paying the producer will probably lead to strong demands from eastern and B.C. farmers for similar treatment to their Prairie counterparts, as well as increasing the likelihood of U.S. countervail. Potential adjustments that should be considered by the Federal Government as part of the review of the program include*

      - *Use of the funds to finance a decoupled income support programs as well as habitat and environmental management programs (perhaps also some regional development/economic diversification initiatives as well) - this would satisfy trading partners, particularly if a one time lump sum or annuity payment not tied to the continuing farm were involved.*
      - *Paying the producer would satisfy Alberta and other interests in diversifying Prairie agriculture.*
      - *Paying the producer would eliminate environmentally unfriendly aspects of existing program.*

   b. *Sunsetting of other programs, particularly WGSA, and ending of Drought and Special Canadian Grains Programs will have a severe impact on farm incomes, unless they are extended or replaced. Although the Government's response may be postponed until the situation at GATT is clearer and this year's market prospects are more certain, sooner or later it*

will have to show its hand. In the long run, replacement income support programs should allow for decoupled income stabilization consistent with long term market trends and maintaining/improving the environment. Such a set of programs could not be designed in time to provide income stabilization this year. Tabling the concepts for a new, environmentally-friendly program at this time would be very attractive as it would serve notice to the farming community of a forthcoming change without immediately implementing it. This would allow time for a full discussion and careful implementation.

c. *Crop Insurance - the amendments to the Federal Crop Insurance Act provide an opportunity to make this set of programs more environmentally friendly, irrespective of whether they are eventually amalgamated with a new income stabilization program or not. Legislation to amend the original Act, which is now before the House, is on a fast track, but negotiations of new federal-provincial agreements are slower. The program could be used to deny benefits where farm practices conflict with other policies or regulatory requirements for environmental protection. These instances could be identified as part of individual agreements or the federal regulations governing the implementation of the Act.*

d. *Supply Management Adjustment is a trade related issue that can probably be addressed as a less financially significant component of WGTA adjustment, though this still needs to be confirmed. As most of the supply managed commodities require a small land base for production their impact on habitat, except as a market for feeds, is limited. Dairy already supports quite a diversified land use because of the mix of crops and permanent cover used to provide feed. The major environmental impact of these commodities is through the handling of animal wastes, already an area of considerable intervention by provincial governments. Unless a stronger potential programming link to the environment can be established, it is not recommended that any more attention be paid to supply management adjustment.*

e. *The policies of the Canadian Wheat Board should be reviewed and revised where necessary so as to remove policies that may under all or certain market conditions provide production incentives to farmers for one or more commodities handled by the Board over others beyond those provided by the international and domestic market conditions. It should also place grain deliveries from farms on a volume rather than areal basis.*

f. *Other Initiatives which could be brought for immediate follow up through various forums discussing sustainable agriculture (some are in fact components of the global approach - #1 - that could be implemented unilaterally).*

- *Incorporation of habitat considerations into existing on farm land programs, e.g., permanent cover, community pastures, windbreaks, stream bank protection.*

- *Expansion of incentive programs for habitat - e.g., under North American*

Waterfowl Management Plan - as well as extension of PFRA Permanent Cover Program after initial response is evaluated, and continued coordination of all programs50 including the use of stacking of incentives where it can be justified.

6. *All departments and agencies of the federal and provincial governments should actively support the design and adjustment of Canadian agricultural policies so that they are all compatible with all of the four pillars of the Federal Minister of Agriculture.*

Delivery Systems

The two key components of a delivery system to encompass the objectives discussed in this report, are how to define, manage and finance local components, and how to provide economic signals (incentives and regulations) in support of natural resource objectives on Canadian farms.

Two ways of providing incentives to supplement the more restrictive and frequently less efficient use of regulations require closer examination:

1. Internalizing within the farm business the costs of control and prevention of environmental degradation, and

2. Internalizing within the farm business the benefits of the provision of environmental services, such as habitat provision.

The costs of environmental degradation induced by farming are felt by the farmer through the costs of increased purchases of inputs or of lower crop yields. Off the farm, agricultural pollutants affect the quality of ground and surface water supplies, the costs of maintaining and the returns from investments in roads, public drainage and water supply systems, and navigation channels. They also affect the quality of the natural resources surrounding farms that is used by forestry, wildlife and other sectors of the economy. Further links induce potentially significant effects on the health of human and wildlife populations.

Generally, it is quite a challenge to price these effects in aggregate, and even more difficult to accurately estimate them on a per farm or per acre basis.

Some environmental desirables, such as wildlife habitat, may be just if not more conveniently regarded as potential benefits rather than costs. The division is somewhat arbitrary as, for example, habitat protection can be regarded just as well as preventing a loss (or degradation) as providing a valued but under-supplied service. Politically it may be easier to sell one rather than the other, but, generally, it will be easier to determine per farm or per acre payments for desirables through willingness of potential benefactors to pay for services and products, than to determine the costs of undesirables.

If an environmental desirable is addressed so as to reduce degradation rather than increase the supply of a service, the challenge, as we have already pointed out, is to design an acceptable and efficient way of internalizing the costs of degradation in farm practices. Possible strategies include:

[50]For example, under the North American Waterfowl Management Plan, coordination of programs run by private and provincial wildlife agencies..

On Regulations - or Why Incentives Should Be Preferred

Regulations tend to have high labour inputs for administration and enforcement. The U.S. uses them heavily for environmental purposes under the existing Farm Bill. It requires all farmers to have conservation plans to be eligible for program benefits. As a consequence an industry has grown up producing mechanistic plans sufficient to meet regulatory requirements. Cross-compliance regulations that are supposed to make farmers comply with conservation requirements have resulted in remarkably few cases of confirmed ineligibility for program benefits given the size of the U.S. farm population and the severity of its conservation problems.

Finally, the far greater land mass and far smaller tax-paying population of Canada compared to the U.S. should always be borne in mind before recommending the application of U.S. policies here.

1. Regulating certain practices - this is difficult to achieve without prior notice and in the absence of commercially viable alternatives. The approach has worked well with the automobile industry where notice of more stringent fuel consumption and emission standards has led to the development of more fuel efficient cars. It requires a sense of what is technically and commercially feasible, and was relatively easy to impose on the automobile industry because of the few producers involved, a market-wide imposition and a market capable of absorbing the increased costs (i.e., in agriculture it would require international coordination if the replacement technologies implied higher production costs). If supply management and border protection is maintained for Canadian agriculture such an approach may be practical for the commodities involved. The CUSTA may also provide a framework for such an approach for commodities sold on the North American market, but for internationally marketed commodities some coordination through international agencies, such as GATT or the O.E.C.D., would seem to be necessary if Canadian competitiveness was to be otherwise adversely affected.

2. Marketable input quotas - are schemes whereby users would be provided with quotas necessary for the purchase of specific inputs. The quotas would be marketable as long as their supply did not exceed demand, and this would provide an economic return for those holders not requiring further use of the input. Thus an economic incentive would be introduced for searching for production alternatives not requiring the input, yet production in the absence of an alternative would not be absolutely prevented. Such an instrument would create an economic value on not using an input that, if non-farmers could purchase quota from farmer-owners, would mean that more of the economic effects of all interests in the use and avoidance of the input would be present in the farmers' business environment. It would provide strong economic incentives to farmers to use inputs efficiently which would not be tied simply to commodity prices but also to the demands of other groups for improved management of the environment. It would be easier to enforce than most regulations, and quotas could be made regional-specific, perhaps on the basis of the carrying capacity of the environment for the effects of the input in question. In spite of these advantages, this instrument has been discussed but apparently never tried[51].

[51]See, R.B.Stewart, 'Economics, Environment and the

3. Incentives and disincentives - are a more straightforward economic concept whereby payments or charges are made to the providers of goods and services by people or their representatives requiring the item in question. There is a well-established history of schemes whereby farmers are paid to contract part or all of their farm to particular uses in favour of environmental or wildlife interests. Generally, the schemes have been designed and delivered by private or quasi-private non-farm interest groups, though the initiatives are frequently financially supported by governments, generally through extending favourable tax considerations (ranging from charitable donations to municipal tax payments). Recently, however, governments have become more heavily involved, generally because of the opportunities such schemes present to save expenditures. Thus the Permanent Pastures Programs delivered by P.F.R.A. in the three Prairie Provinces save the Federal Governments from commitments had the areas concerned remained in annual crop farming (this program is discussed in more detail in Chapter 4). The Conservation Reserve Program in the United States is designed to take land out of production thus saving not only commodity price support payments on crops likely to be otherwise grown there, as well as the costs of soil erosion and water degradation.

   To some extent at least the success of such schemes is only limited by:

   a. The willingness of farmers to provide the services in question at the suggested price,

   b. The ability of the other interest group to pay for sufficient contracts to make the program worthwhile, and

   c. The resources available to market and implement the program.

   The latter two considerations point to two potential drawbacks to the approach. It requires considerable delivery resources, and it may not work well if extensive areas are to be affected rather than few, precisely targeted sites. Some options which may reduce these burdens but at a loss of precision in locating the farm areas involved would be for non-farm interests to purchase regulatory requirements for farm production, for example, Wheat Board quotas, so as to encourage alternative land uses. The need for new delivery resources could be minimized by using existing agencies, such as municipal organizations or conservation districts. This, of course, would also be consistent with promoting the concept of a farm as a source of many products and services, having more than one source of income.

   Imposing charges in order to discourage production practices may be consistent with 'producer pay' principles that are a policy of most governments regarding point source pollution, such as that caused by individual factories. Apart from their possible unpopularity with the farming community, they suffer from a number of serious shortcomings:

   a. It would be difficult to impose them constructively on financially stressed farmers, and imposing them only on the fi-

Limits of Legal Control', in B.Sadler (Ed), Environmental Protection and Resource Development: Convergence for today, University of Calgary Press, Calgary, 1985, and O.E.C.D., Agriculture and Environment Policies: Opportunities for Integration, Paris, 1989, see page 39.

nancially more successful ones would hardly be equitable,

b. In many cases, the pollution costs that would need to be recovered would be next to impossible to calculate on a per farm or per farm acreage basis except in a very arbitrary, and probably appealable manner (how do you establish that a particular grain of soil or molecule of fertilizer in a waterway comes from a specific farm?),

c. Administrative and policing costs could be considerable if the charging rules were not arbitrary,

d. If a charge scheme was feasible then it is likely that a marketable quota scheme would also be, and the latter offers more flexibility and improved economic signals.

However, it is conceivable that situations do exist where financially viable production alternatives are available and there is absolutely no reason to tolerate a practice. In these cases charges or regulatory bans could be used, as discussed by Girt[52].

Finally, but certainly not least, is the whole issue of information. The basis of improved environmental management on farms has to be the organization and use of its land base as a system, yet most advice and other forms of information is provided on an issue or commodity basis. This approach needs to be replaced with one that provides farmers with decision making support covering the following areas, ensemble:

1. Management and selection of products to optimize income streams over a reasonable planning horizon, i.e., more than one season but less than a generation.
2. Efficient management of inputs, including land, so as to achieve the above and so as to protect and enhance soil, water and wildlife resources on and off the farm.

Only when such information is available will it be possible to consider the use of incentives to direct and regulate the use of farm inputs. Probably one agency should have the responsibility for the development of 'best management strategies' for a region, and have considerable powers of direction over research and extension. Options for such an organization require development.

Recommendations:

1. *As part of existing and new soil and water conservation agreements, as well as agricultural programs planned for the North American Waterfowl Management Plan, governments and other agencies should support, amongst other activities:*

   a. *Research, information and advice into best management practices on a field and farm basis, incorporating environmental considerations into business-oriented decision making,*

   b. *Application of approaches for the regulation / control of environmental pollutants, including targets, monitoring systems, etc.,*

   c. *Design of incentives on the bases of the public interest in the protection and*

[52] J.Girt, 'The On-Farm Economics of Sustainability and Public Intervention', Canadian farm Economics

rehabilitation of natural resources, and the willingness of farmers to participate. The latter could be determined by a farmer bidding system, as used in the U.S. and by P.F.R.A. in its Permanent Cover Programs.

Delivery options for this package to be considered include, in addition to existing organizations, the use of local municipalities, conservation districts and non-profit trusts. The latter may have some distinct advantages in that they would not be tied to one bureaucracy, and would be able to level private sector funds, for example, from agri-businesses, and wildlife and conservation organizations more easily than governments. The former, however, may already have a suitable delivery system in place.

2. *Governments should determine a funding strategy for these delivery systems and their associated programming. Sources to be considered include:*

   a. *existing funds of agricultural and wildlife agencies,*

   b. *new moneys from private as well as public sources.*

3. *The Federal Government should consider allowing payments for habitat and environmental protection to be financed, partially or completely, from savings to existing agricultural programs resulting from voluntary, incentive-driven decisions by farmers. Future savings on agricultural expenditures could be used to offset expenditures on incentive programs in earlier years.*

4. *Incentives to farmers for habitat protection and environmental protection should be designed to provide permanent protection unrelated to fluctuations in commodity prices. This will require use of such devices as the purchase of easements, and the provision of one time payments and annuity systems in return for long run land use commitments. The effectiveness of these alternative approaches is not known although there is considerable experience in their use in North America. This requirement of a long term commitment reinforces the need to make adjustments to existing agricultural policies so as to remove competing incentives that work against protection of habitat and the environment. Policy adjustments will also provide a measure of the commitment of Canadian governments to the North American Waterfowl Management Plan. Three quarters of the funding under the Plan is to come from the United States. The agencies supplying these funds to Canada will require indications of the commitment to the objectives of the Plan, including the components relating to habitat on farms and the consequent agricultural policy adjustments.*

5. *The Federal Government should consider the use of Western Grain Transportation Funds for the above purposes and for a decoupled farm income stabilization program (along with consequent savings from existing income support programs) as part of its review of the Program.*

Appendix
Factors determining optimal public incentives for the conversion of farmland to habitat

Assuming that the economics of farming the land in question continues to be based partly on subsidies, and that payments for habitat conversion should be based significantly on current rents for the type of land in question, since the rents reflect the value of using the land for farming, a number of conclusions can be drawn about the incentives necessary for conversion:

1. Making payments for conversion less than annual rent payments, as in the case in most provinces today, will only ensure that land providing returns from farming of less than the rental payment will be included, unless the farmer wishes to lose income from the conversion.

2. The cost to society of a conversion will only be significant if the cost of providing the incentive and of developing and maintaining the habitat is more than the cost of governments' agricultural payments if the conversion did not occur less the net public return from making the conversion:

   In the optimum situation:

   $$C = P - Q + A$$

   where,

   C = government payment for converting farmland to habitat,

   P = government payments for agricultural uses of the land,

   Q = net public returns from using the land as habitat after making the payment C,

   A = net public returns from agricultural use of the land after making the payment P.

   The relationships represented in the equation thus imply that C should be less than governments' agricultural payments if Q is greater than A. Unfortunately, C is generally operationalized as a function of rents, which are a function of farm returns and, consequently, heavily influenced by P.

3. From the farmer's as opposed to public's perspective, conversion will only make sense if C less his costs of having the land in habitat is greater than the net income from farming, including P, that is:

   $$C - R \geq S - O + P$$

   where

   R = costs to the farmer of having the land in habitat,

   S = value of sales when land is in agriculture,

   O = operating costs incurred on the land when it is used in agriculture.

   If R is positive, the incentive offered will have to be greater than the current net income from farming. If it is negative, the incentive could, of course, be less.

4. Combining both public and private

points of view, the conditions where incentives would just result in a conversion are:

$$C = P \quad \text{and}$$
$$C - R = S - O + P$$

implying that R would have to be the negative of the difference between S and O, or less.

Now assume that C is made a function of rent for the land as farmland, a logical choice; and that also, quite logically as the farmers' cash and labour inputs when the land is in habitat will be reduced compared to whe.ı it is in agriculture, C is less than L, the rent. We can now make the following conclusions, assuming that there are costs to the farmer of habitat, that is that R is positive. The rent offered will have to the greater than

$$C > f^{-1}(S - O + P)$$

where

$$C = f(L)$$
$$= f[g(S - O + P)]$$

It follows that $g > 1$ and that annual rents on farmland have to be greater than the annual net returns from agricultural production for conversions to make sense and this should not occur except on an exceptional basis - farmers must losing money from agriculture unless the farmer expects to receive annual benefits from conversion to habitat, not counting the incentive payment, greater than his costs for the same use. Note also that L is positively related to P so that unless R is negative, increasing government payments for agriculture will have a greater than equal effect on reducing rates of habitat conversion unless C is increased.

5. Conclusions:

a. Priority should be placed on stimulating farmers' awareness of locations where they lose money out of agricultural operations,

b. Priority should be placed on identifying situations where the net private gains from conversions to habitat will be positive,

c. Agricultural programs which inflate the true income generating potential of land in agricultural uses should be avoided, they discriminates against habitat.

d. Programs should be designed so that the net private returns from habitat conversion are positive - this will probably require some payment to reflect returns from selling the land as farmland, perhaps an annuity.